COULTER® Slide Making Modules

Service Manual

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Beckman Coulter, Inc.
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BECKMAN COULTER™

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Revision B incorporates information from service memos 1939 and 1963 and for the LH SlideMaker. As part of adding the LH 750 System information, the red and yellow traffic light icons were replaced with text in the error message tables. This replacement is not marked with change bars, as that would mask true technical changes. Technical changes were made on the following pages: 1.1-1, 1.1-3, 1.1-4, 1.2-1, 1.2-2, 2.1-1, 2.1-2, 2.1-3, 2.1-4, 2.2-3, 2.2-4, 2.2-6, 2.3-6, 2.4-2, 2.4-6, 2.5-2, 2.5-3, 2.5-9, 2.5-15, 3.1-1, 3.1-2, 3.2-1, 3.3-2, 3.3-5, 3.3-6, 3.3-7, 3.3-8, 3.3-9, 3.4-2, 3.4-2, 3.4-4, 3.4-5, 3.4-6, 3.5-1, 4.1-2, 4.1-3, 4.1-12, 4.8-3, 4.9-2,4.10-1, 4.13-1, 4.13-2, 5.2-4, 7.1-1, 7.1-2, 7.2-3, 7.2-6, 7.2-7, 7.2-12, 7.2-20, 7.2-39, 7.2-41, 7.2-42, 7.2-43, 7.2-45, 7.2-46, 7.2-47, 7.2-48, 8.2-1 through 8.2-15, 8.2-18, 8.2-19, 8.2-22, 8.2-23, 8.1-2 through 8.1-12, 8.1-14, 8.2-21, 8.2-26, 8.2-27 through 8.2-32, A.3-2, A.3-5, A.3-6, B.1-1, B.1-2, and ABBREVIATIONS-2.

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Revision C updates the installation procedures and associated information to address installation problems experienced during the controlled release of the LH 750 System. In addition, the engineering schematics have been removed from Chapter 6 and added to a CD-ROM in the Service Resource Kit.

Changes were made on the following pages: 3.3-1, 3.3-2, 3.3-4, 3.3-4, 3.3-5, 3.3-6, 3.3-7, 3.3-8, 3.3-9, 3.3-10, 3.3-11, 3.4-1, 3.4-2, 3.4-4, 3.4-6 through 3.4-8, 3.4-9 through 3.4-11, 3.4-12 through 3.4-13, and 6.1-1.

Changes that are part of the most recent revision are indicated in the printed copy by a bar in the margin of the amended page.

This document applies to the latest software listed and higher versions. When a subsequent software version affects the information in this document, the changes will be included on minor revision change pages or summarized on a Notice of Information Update form and will be released by service memo.

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1.1 MANUAL DESCRIPTION

Scope

This manual provides the reference information and procedures needed for repairing and maintaining the COULTER® GEN•S SM™ SlideMaker and the COULTER® LH SlideMaker. It is available both electronically and in hard copy. The electronic manual is released on the Service Resource Kit CD-ROM, PN 6417471.

This manual does not cover information and procedures for the SlideMakers already covered in the System's Online Help System and/or in the following customer documents:

COULTER GEN•S System	COULTER LH 750 System
• Getting Started, PN 4237304	• Getting Started, PN 4277302
• SlideMaker Operator's Guide, PN 4237212	• SlideMaker Operator's Guide English, PN 4277299 French, PN 4277280 German, 4277287 Italian, PN 4277283 Japanese, PN 4277296 Spanish, PN 4277291
• Master Index, PN 4237224	• Master Index, PN 4277301
• Host Transmission Specification, PN 4237306	• Host Transmission Specification, PN 4277303

To service the Analytical Station (Power Supply, Diluter and Analyzer) of the COULTER® GEN•S System or the COULTER® LH 750 System, refer to the COULTER Analytical Stations Service Manual, PN 4277219.

To service the Workstation in the GEN•S Cell, refer to the COULTER GEN•S Workstation Configuration, PN 9023572. To service the Workstation in the LH750 Cell, refer to the COULTER LH 700 Series Workstation Configuration, PN 9023736.

To service the COULTER® GEN•S ST™ SlideStainer or the COULTER® LH SlideStainer, refer to the COULTER® Slide Staining Modules Service Manual, PN 4237601.

Intended Audience

To use this manual effectively, you need the following:

- An operator's knowledge of the GEN•S System and the LH 750 System, including the SlideMaker option
- Service training on the GEN•S SM™ SlideMaker and the LH SlideMaker
- A thorough understanding of -
  - Basic electronic and pneumatic principles and devices
  - Hematology terms and concepts
  - Troubleshooting techniques
- The ability to -
  - Read pneumatic/hydraulic schematics and understand related terminology

- Read electronic schematics and understand related terminology
- Use a digital multimeter and an oscilloscope
- Use basic mechanical tools and understand related terminology

Organization

The information in this manual is organized into 10 chapters. To make it easier to access the information:

- In the electronic manual, each page or screen has -
  - A Contents button linked to a master table of contents.
  - An Illustrations button linked to a master list of illustrations.
  - A Tables button linked to a master list of tables.
  - An Index button linked to an alphabetic index.
- In the printed manual, there is a master table of contents (including master lists of the illustrations and the tables) at the beginning of the manual, a chapter-specific table of contents at the beginning of each chapter, and an alphabetic index at the end of the manual.

Chapter 1, INTRODUCTION, includes a brief description of this manual, a list of supporting documents, and essential safety information.

CHAPTER 2, INSTRUMENT DESCRIPTION, includes the function and location of each major SlideMaker module and an explanation of the instrument's operation by system.

CHAPTER 3, INSTALLATION PROCEDURES, contains the procedures used to install the SlideMaker.

CHAPTER 4, SERVICE AND REPAIR PROCEDURES, contains the procedures used to service and repair the SlideMaker. Each procedure includes a purpose statement and a list of any special tools or equipment needed in addition to the standard tool kit.

CHAPTER 5, MAINTENANCE PROCEDURES, contains the procedures used to maintain the SlideMaker and to verify the system is operating correctly.

CHAPTER 6, SCHEMATICS, is provided for the insertion of SlideMaker schematics.

CHAPTER 7, TROUBLESHOOTING, contains problem descriptions, including a complete list of error messages, with troubleshooting actions and tips. Use the information in this chapter in conjunction with the procedures in Chapter 4 to locate and correct instrument problems.

CHAPTER 8, PARTS LISTS, includes a master list of the SlideMaker field replaceable components (FRC) and field replaceable units (FRU), and illustrations of these components.

CHAPTER 9, APPENDICES, is provided for the addition of reference material. Appendix A, QUICK REFERENCE INFORMATION, contains instrument specifications and tolerances, jumper and switch settings, test point and connector locations, function tables, and software menu trees.

CHAPTER 10, ABBREVIATIONS, contains a list of abbreviations used in this manual.

Numbering Format

Each chapter of this manual is further divided into topics that are numbered sequentially, beginning at one. The numbering format for the topic heading, which is called the primary heading, is chapter number, decimal point, topic number. For example, the primary heading number for the fifth topic covered in Chapter 2 is 2.5.

The page, figure and table numbers are tied directly to the primary heading number. For example, Heading 2.5 begins on page 2.5-1, the first figure under Heading 2.5 is Figure 2.5-1 and the first table under Heading 2.5 is Table 2.5-1.

Note: In the printed manual, primary headings always begin on the top of a right-hand page.

Special Headings

Throughout this manual WARNING, CAUTION, IMPORTANT, ATTENTION and Note headings are used to indicate potentially hazardous situations and important or helpful information.

Warning

A WARNING indicates a situation or procedure that, if ignored, can cause serious personal injury. The word WARNING is in bold-faced text in the printed manual and is red in the electronic manual.

Caution

A CAUTION indicates a situation or procedure that, if ignored, can cause damage to equipment. The word CAUTION is in bold-faced text in the printed manual and is red in the electronic manual.

Important

An IMPORTANT indicates a situation or procedure that, if ignored can result in erroneous test results. The word IMPORTANT is in bold-faced text in the printed manual and is red in the electronic manual.

Attention

An ATTENTION contains information that is critical for the successful completion of a procedure and/or operation of the instrument. The word ATTENTION is in bold-faced text in the printed manual and is red in the electronic manual.

Note

A Note contains information that is important to remember or helpful in performing a procedure. The word Note is in bold-faced text.

Conventions

This manual uses the following conventions to make the material clearer and more concise, or to enhance access speed in the electronic version. An example is given below each explanation.

1. Messages that appear on a screen are in italics.

When the Coulter Communications screen displays, *Select any key to continue*, press any key.

2. Selections that appear on a screen are boldfaced.

   From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ SYSTEM SETTINGS.**

3. Information that is to be typed is in Courier font.

   Insert the software disk into your laptop computer, type `A:\INSTALL,` and press Enter.

4. Keys on the Workstation or on a laptop computer are boxed.

   Press Alt+X to exit.

5. Keys that are to be pressed simultaneously are printed with a plus sign between the keys.

   When the Command Menu appears, press Shift+2 to select **Download 'A' and 'B.'**

6. The software path to a specific function or screen appears with the double solid-right triangle (▸▸) symbol between succeeding screen options.

   From the MAIN MENU, select **SERVICE FUNCTIONS ▸▸ SERVO SYSTEM ▸▸ RESET SERVO SYSTEM**.

7. When the word "select" is used in conjunction with the screen and its associated keys, you are to press the key or keys necessary to display the desired screen or to initiate the desired function.

   At the MAIN MENU of the SlideMaker, select **SERVICE FUNCTIONS.** (In this case you press one button, the button next to the **SERVICE FUNCTIONS** prompt, to display the screen.)

   From the MAIN MENU, select **SERVICE FUNCTIONS ▸▸ SERVO SYSTEM ▸▸ RESET SERVO SYSTEM**. (In this case you press three buttons in succession to display the RESET SERVO SYSTEM screen.)

8. When reference is made to a key (or button) located on the Diluter keypad in the GEN•S System and on the numeric keypad in the LH 750 System, the location is referred to as the Diluter/numeric keypad.

   Calibrate BD3 using the F79 function on the Diluter/numeric keypad.

9. In the electronic version of the manual:

   a. Links to additional information are in blue and are underlined.

      Remove the Cassette Output Queue module to access the shuttle. See the Cassette Output Queue Module removal procedure under Heading 4.1.

      To access the linked information, select the blue, underlined text.

   b. The material is divided into many small sections (electronic files).

      - Every primary heading is a separate file and whenever possible the amount of material contained within one primary heading is limited to four to ten pages.
      - If a primary heading must be large, such as the illustrated parts list, invisible breaks are added to the electronic file to further divide it.

      To move from one section (electronic file) to the next in an HTML version of the manual, use the right and left arrows on the navigation bar.

1.2 SAFETY PRECAUTIONS

This section covers safety precautions that you must take whenever you are working on the SlideMaker. In addition, when following a procedure in this manual, always follow any safety precautions included in that procedure.

Electronic

WARNING Risk of personal injury. Rings or jewelry can contact exposed electronic components, causing personal injury from electric shock. Remove rings and other metallic jewelry before performing maintenance or service on the electronic components of the instrument.

WARNING Risk of personal injury. Contacting exposed electronic components while the instrument is attached to power can cause personal injury from electric shock. Power down completely before removing covers to access electronic components.

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

CAUTION Risk of damage to driver circuitry. Connecting or disconnecting a solenoid while the power is ON can damage the driver circuitry. Turn OFF the power before connecting or disconnecting a solenoid.

CAUTION Risk of damage to electronic components. Electrostatic discharge (ESD) can damage disk drives, add-in circuit cards and other electronic components. Perform any procedures where there is a possibility of ESD damage at an ESD workstation or wear an antistatic wrist strap attached to a metallic part of the chassis connected to an earth ground.

CAUTION Risk of fire hazard. Replacing a fuse or fuse holder with the incorrect type or rating can overheat the wiring, causing a fire. Always replace a fuse or fuse holder with the type and rating specified for that circuit.

Biological

WARNING Risk of personal injury or contamination. If you do not properly shield yourself before servicing the SlideMaker with the door open, you can be injured or contaminated. To prevent possible injury or contamination, always wear gloves, a lab coat, and eye protection when servicing the instrument with the doors open.

WARNING Risk of contamination. Biohazardous contamination can occur from contact with the waste container and its associated tubing if not handled with care. Wear protective gear. Avoid skin contact. Clean up spills immediately. Dispose of the contents of the waste container in accordance with the local regulations and acceptable laboratory procedures.

WARNING Risk of personal injury and contamination. Some slide processing areas are movable and can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. Wait for moving parts to stop.

Use care when working with pathogenic materials. Means must be available to decontaminate the instrument, provide ventilation and to dispose of waste liquid. Refer to the following publications for further guidance on decontamination.

- Biohazards Safety Guide, 1974, National Institute of Health
- Classifications of Etiological Agents on the Basis of Hazards, 3d ed., June 1974, Center for Disease Control, U.S. Public Health Service.

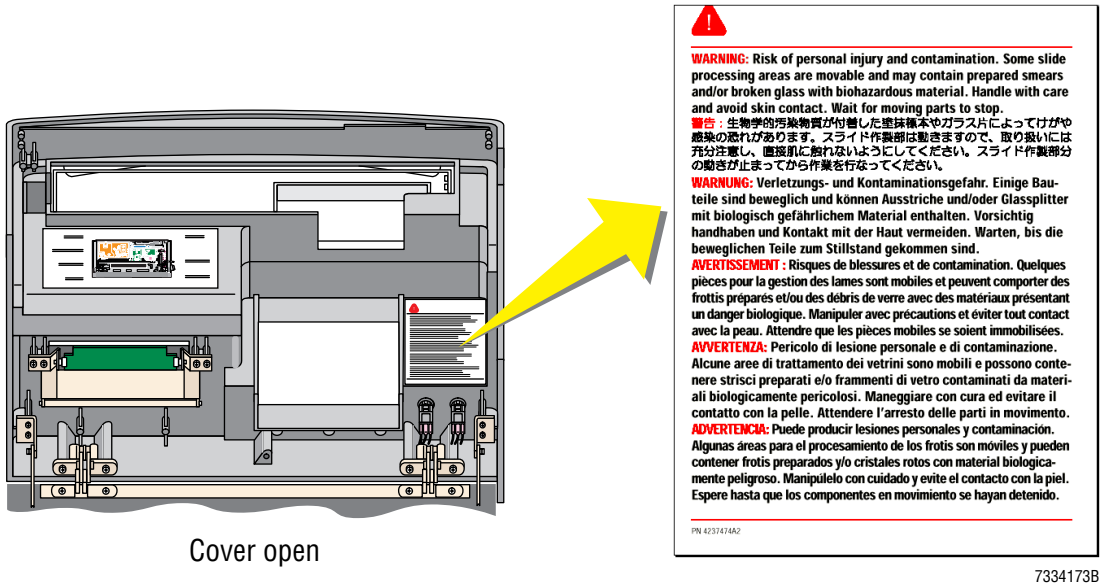
Troubleshooting

Bring the following warning to the customer's attention before advising that customer to perform any service, maintenance or troubleshooting procedures on the instrument.

WARNING Risk of personal injury or contamination. If you do not properly shield yourself while performing service, maintenance and troubleshooting procedures, residual fluids in the instrument can injure or contaminate you. Beckman Coulter recommends barrier protection, such as appropriate safety glasses, lab coat, and gloves, be worn throughout the performance of service, maintenance and troubleshooting procedures to avoid contact with cleaners and residual fluids in the instrument.

Also make sure the GEN•S SM SlideMaker customer is aware of the Warning label shown in Figure 1.2-1.

Figure 1.2-1 Warning Label


WARNING: Risk of personal injury and contamination. Some slide processing areas are movable and may contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. Wait for moving parts to stop.
警告：生物学的汚染物質が付着した塗抹標本やガラス片によってけがや感染の恐れがあります。スライド作製部は動きますので、取り扱いには充分注意し、直接肌に触れないようにしてください。スライド作製部分の動きが止まってから作業を行なってください。
WARNUNG: Verletzungs- und Kontaminationsgefahr. Einige Bauteile sind beweglich und können Ausstriche und/oder Glassplitter mit biologisch gefährlichem Material enthalten. Vorsichtig handhaben und Kontakt mit der Haut vermeiden. Warten, bis die beweglichen Teile zum Stillstand gekommen sind.
AVERTISSEMENT : Risques de blessures et de contamination. Quelques pièces pour la gestion des lames sont mobiles et peuvent comporter des frottis préparés et/ou des débris de verre avec des matériaux présentant un danger biologique. Manipuler avec précautions et éviter tout contact avec la peau. Attendre que les pièces mobiles se soient immobilisées.
AVVERTENZA: Pericolo di lesione personale e di contaminazione. Alcune aree di trattamento dei vetrini sono mobili e possono contenere strisci preparati e/o frammenti di vetro contaminati da materiali biologicamente pericolosi. Maneggiare con cura ed evitare il contatto con la pelle. Attendere l'arresto delle parti in movimento.
ADVERTENCIA: Puede producir lesiones personales y contaminación. Algunas áreas para el procesamiento de los frotis son móviles y pueden contener frotis preparados y/o cristales rotos con material biologicamente peligroso. Manipúlelo con cuidado y evite el contacto con la piel. Espere hasta que los componentes en movimiento se hayan detenido.
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2.1 INTRODUCTION TO THE SLIDEMAKER

Summary

This section briefly describes the GEN•S SM SlideMaker and the LH SlideMaker - their functions, systems and modules - and references the appropriate customer documents and/or headings within this document for details.

Function

The SlideMaker creates a blood smear on a clean microscopic slide using a segment of a blood sample aspirated by the Analytical Station.

Description

Overview

The GEN•S SM SlideMaker (an optional peripheral unit for the GEN•S System) and the LH SlideMaker (an optional peripheral unit for the LH 750 System) interface with the Power Supply, the Analyzer, the Diluter and the Workstation.

- Power Supply - Provides the pneumatic power for the SlideMaker.
- Analyzer - Controls cycle timing and instrument status.
- Diluter - Allows acquisition of whole-blood samples for the SlideMaker via the needle.
- Workstation - Allows customers to select which whole-blood samples are processed for slides.

Systems

The SlideMaker comprises several systems, each performing a specific function. This chapter includes a description of the following systems:

- Electronic Power - Develops, monitors and distributes dc voltages. (See Heading 2.2.)
- Fluidic- Acquires, regulates, monitors, and distributes vacuums and pressures; monitors and distributes diluent and cleaning agent; and collects waste. (See Heading 2.3.)
- System Control - Controls the operation of the SlideMaker. (See Heading 2.4.)
- Sample Acquisition - Acquires and dispenses whole-blood samples from the specimens being processed by the Analytical Station. (See Heading 2.5.)
- Smear Processing - Prepares stain-ready, whole-blood smears. (See Headings 2.6, 2.7, 2.8, 2.9, 2.10 and 2.11.)

Modules

Many of the components in the SlideMaker are grouped physically, by function, into modules that are easily removed for repair or replacement. Table 2.1-1 lists these modules, briefly describes their functions, and references the appropriate headings within this chapter for detailed information.

With the exception of the Sample Access and Reservoir module, these modules are located in the SlideMaker as shown in Figures 2.1-1 and 2.1-2. The Sample Access and Reservoir module is located in the Diluter of the GEN•S System or the LH 750 System. See Figure 2.1-1.

To remove the SlideMaker modules, refer to Accessing and Removing the SlideMaker Modules under Heading 4.1, GUIDELINES FOR SERVICING THE SLIDEMAKER.

Table 2.1-1 SlideMaker Modules

Module Name	Function	For Details See
Basket Queue	Moves empty slide baskets to the Slide Elevator module to receive the dried slides, and then moves the filled slide baskets away from the Slide Elevator module for retrieval by the operator or the SlideStainer.	Heading 2.11
Cassette Transport - consists of three modules - • Cassette Input Queue • Cassette Output Queue • Slide Ejector.	Moves filled slide cassettes into position for retrieval of the slides, retrieves the slides from the slide cassettes, and then moves the empty slide cassettes into position for retrieval by the operator.	Heading 2.6
Dispense	Provides the hardware for measuring the drop of blood used for a smear and, in conjunction with the Sample Access and Reservoir module, controls the volume, separation and positioning of the blood sample, and the rinsing and drying of the sample transport lines.	Heading 2.5
Dryer	Receives a labeled, wet, smear slide from the Slide and Smear module, dries the smear, and moves the smear to the Slide Elevator module.	Heading 2.9
Keypad and Display	Displays the SlideMaker status and error messages, and provides buttons and screens for operator interface with the SlideMaker.	Heading 2.4
Label Printer	A dedicated label printer that prints labels and applies the labels to the slides.	Heading 2.8
Main Fluidics	A centralized source of pneumatic power, reagents, and waste collection for the Dispense module.	Heading 2.3
Sample Access and Reservoir	Provides the pathway for sample aspiration from the Analytical Station to the SlideMaker and, in conjunction with the Dispense module, controls the volume, separation and positioning of the blood sample, and the rinsing and drying of the sample transport lines.	Heading 2.5
Slide and Smear - consists of two modules • Slide Transport • Smear.	Transports and precisely positions the slide at the various locations in the SlideMaker for preparing the slide and makes a wedge blood smear on the slide.	Heading 2.7
Slide Elevator	Receives dried smear slides from the Dryer module and inserts the slides into slide baskets in the Basket Queue module.	Heading 2.10

Diagnostic Products

Refer to the Reference section of the User's Manual or the Online Help System for the diagnostic products used on the SlideMaker.

Physical Specifications

See Heading 3.1, Preinstallation Checklist, for the physical specifications needed to install the SlideMaker. For any other physical specifications, refer to the Reference section of the SlideMaker Operator's Manual or the Online Help System.

Figure 2.1-1 SlideMaker Modules Not Under the SlideMaker Cover

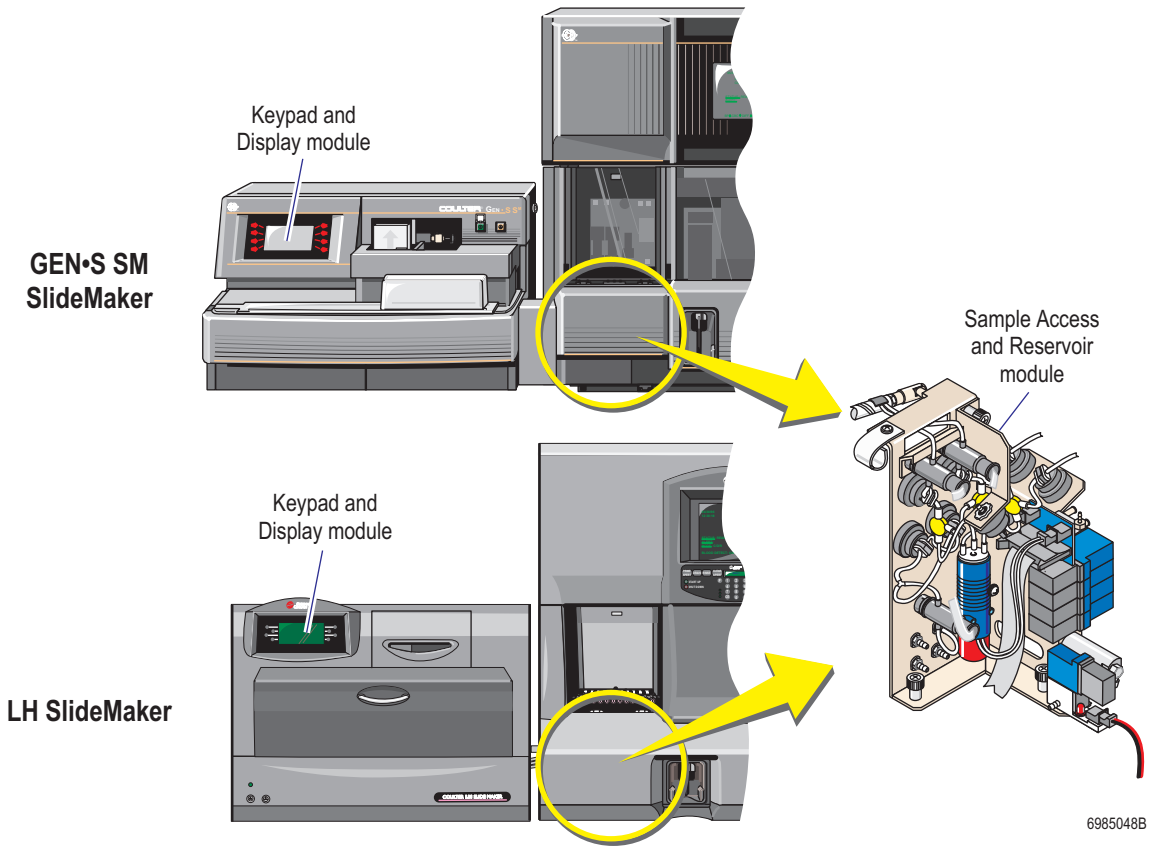
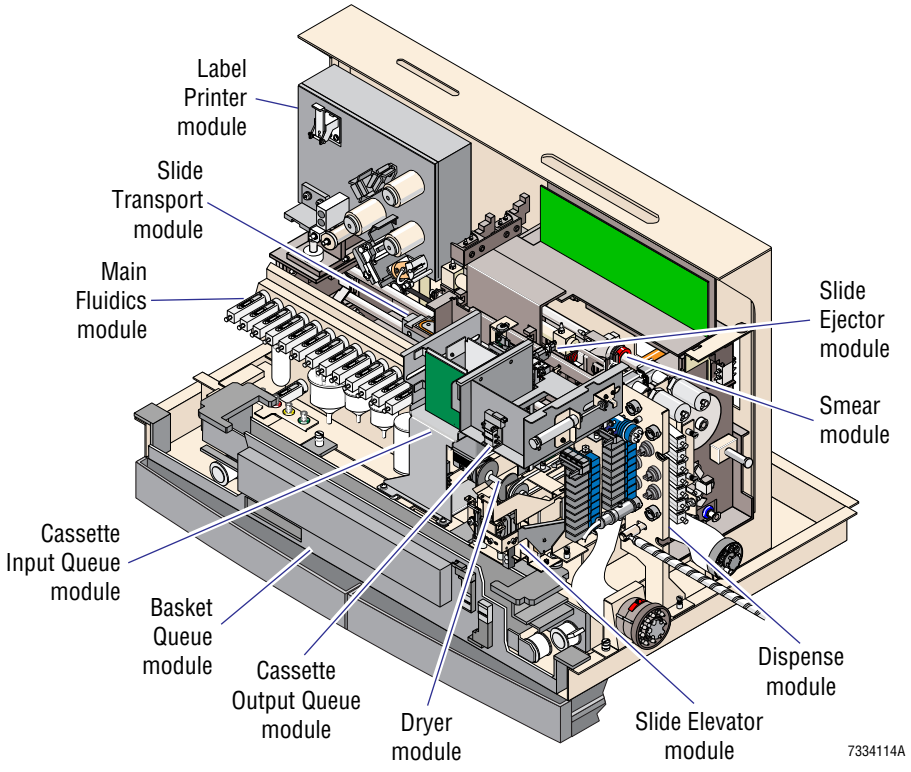


Figure 2.1-2 SlideMaker Modules Under the SlideMaker Cover



Performance Specifications and Characteristics

See Appendix A, Quick Reference Information, for the performance specifications needed to service the SlideMaker. For any other performance specifications or performance characteristics, refer to the Reference section of the Operator's Manual or the Online Help System.

Leakage Current Specifications

Beckman Coulter instruments are evaluated and approved to Underwriters Laboratories Standard 1262, Laboratory Equipment. Testing was performed by Electrical Testing Laboratories (ETL). Leakage current is tested per Section 6.7 - EXCEPTION:

> Equipment required to have primary circuit filtering to meet Electromagnetic Compatibility (EMC) regulations may have a Leakage Current at accessible parts of more than 500 µA, but must not exceed 5.0 mA.

Beckman Coulter instruments such as the GEN•S System and the LH 750 System and their peripherals incorporate primary circuit filtering to meet EMC requirements, therefore the exception in UL Standard 1262, Section 6.7 is applicable and allows a leakage current as high as 5.0 mA.

Computer systems, such as the GEN•S Workstation and the LH 750 Workstation, and their peripherals are evaluated and approved to Underwriters Laboratories Standard 478, Information Processing and Business Equipment, prior to being approved for use with Coulter instruments. Leakage current is tested per Section 28 A, paragraph 28 A.3, EXCEPTION:

> A unit that requires electromagnetic interference filters or filtering capacitors or both for functional performance or to meet EMC regulations (for example FCC regulations) may have Leakage Current in excess of 500 µA but must not exceed 3.5 mA.

Computers and their peripherals used with the GEN•S System and the LH 750 System employ EMC filtering devices as described in UL 478 Section 28 A, paragraph 28 A.3, EXCEPTION; therefore the maximum allowable leakage current is 3.5 mA.

Operation

Operating Procedures

Refer to the Operating section of the SlideMaker Operator's Guide or the Online Help System for the operating procedures.

2.2 ELECTRONIC POWER SYSTEM

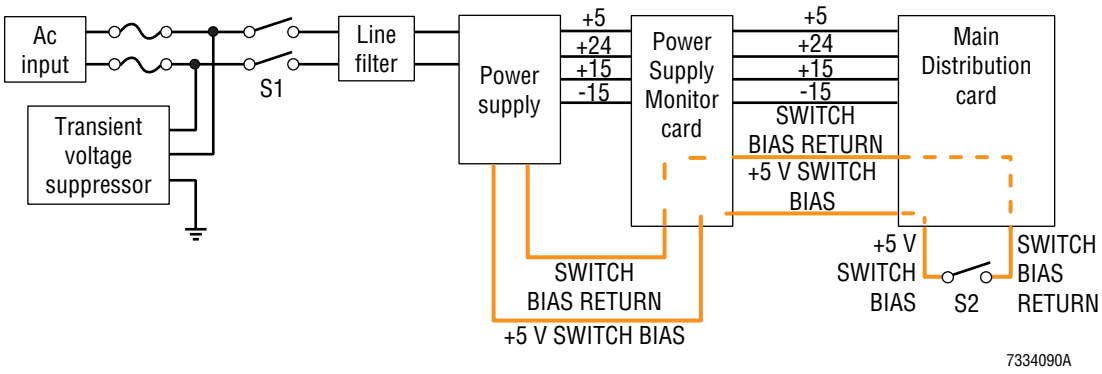
Summary

The electronic power system converts the ac input line voltage to the dc voltages needed in the SlideMaker, monitors the power and distributes the power. This section describes the components responsible for performing these functions, including the Power Supply, the Power Supply Monitor Card and the Main Distribution Card.

Electronic Power System Overview

Refer to the block diagram of the electronic power supply, Figure 2.2-1, as you read this section.

Figure 2.2-1 Electronic Power Supply Overview



Pressing the main power switch, S1, on the rear of the SlideMaker routes the ac input voltage through the line filter to the power supply. The power supply generates a +5 V switch bias voltage and routes the voltage, via the Power Supply Monitor card and Main Distribution card, to the power on/off switch, S2, on the front panel. When the power on/off switch is in its off state, the +5 V switch bias voltage is routed back to the power supply.

Pressing the power on/off switch, S2, opens the switch circuit. The power supply detects the drop in return voltage and enables the main power voltages: +24 V, +5 V, +15 V and -15 V.

The power supply routes the main power voltages to the Power Supply Monitor card for monitoring and for distribution. The Power Supply Monitor card distributes the voltages as shown in Figure 2.2-2.

Electronic Power System Hazard Reduction

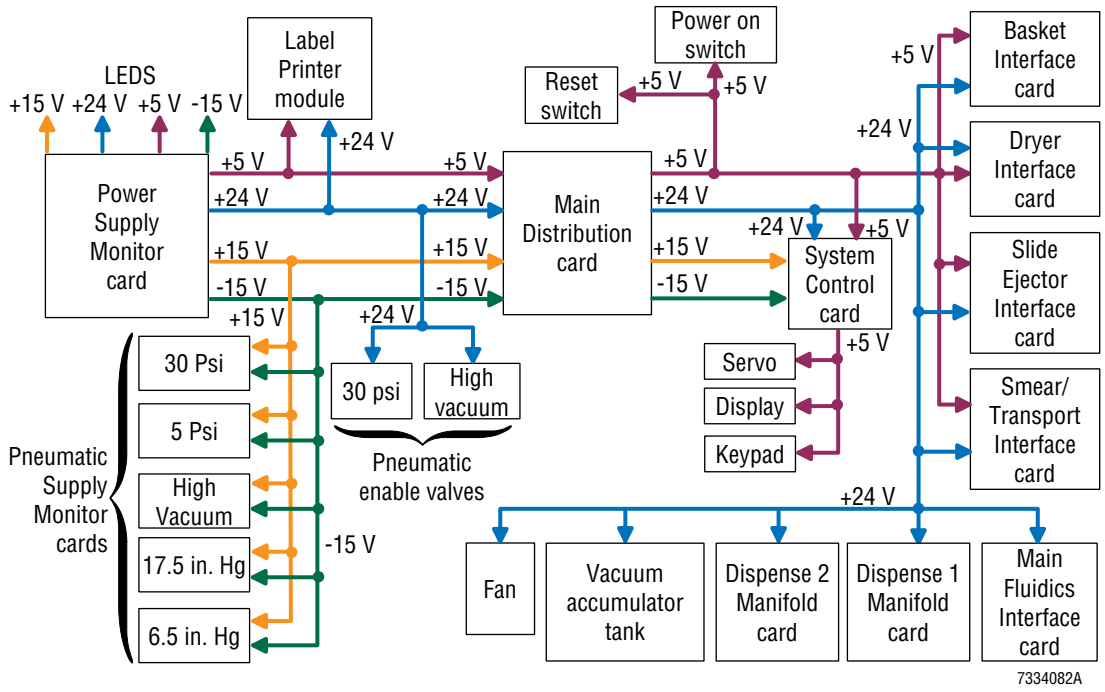
To minimize the risk to anyone servicing the SlideMaker:

- The ac power is confined to the rear panel, concentrating and reducing the number of energized components in an enclosed area.
- Protective sleeving and covers are provided to those components that remain "live" when power is turned off, the ac receptacle, transient suppressor, fuses, and power switch.

WARNING Risk of personal injury. Contacting exposed electronic components while the instrument is attached to power can cause personal injury from electric shock. Power down completely (that is, turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet) before removing covers to access electronic components.

In spite of the fail-safes implemented, it is highly recommended that you always disconnect the power cable from the wall outlet when servicing the SlideMaker.

Figure 2.2-2 Electronic Power Distribution



Power Input

Power Cable

The power cable connects the SlideMaker to a standard ac wall outlet. Two power cables are available in the Service Installation kit:

- The American-style power connector conforms to the Underwriters Laboratory (UL) specifications.
- The European-style power connector conforms to most agencies governing in Europe.

Line Voltage Input Protection

Primary ac input to the SlideMaker is protected by a transient voltage suppressor and two ac filters to prevent damage and performance degradation from line voltage variations (nominal value exceeded by 10%), line spikes, or random power line interruptions. These components are located on the rear access panel. See Figure 2.2-3.

The transient voltage suppressor eliminates high voltage spikes, such as caused by lightning strikes, avoiding damage to the power supply.

The two ac filters, an ac receptacle and a line filter, isolate noise and protect both the SlideMaker and the ac input line.

Fuses

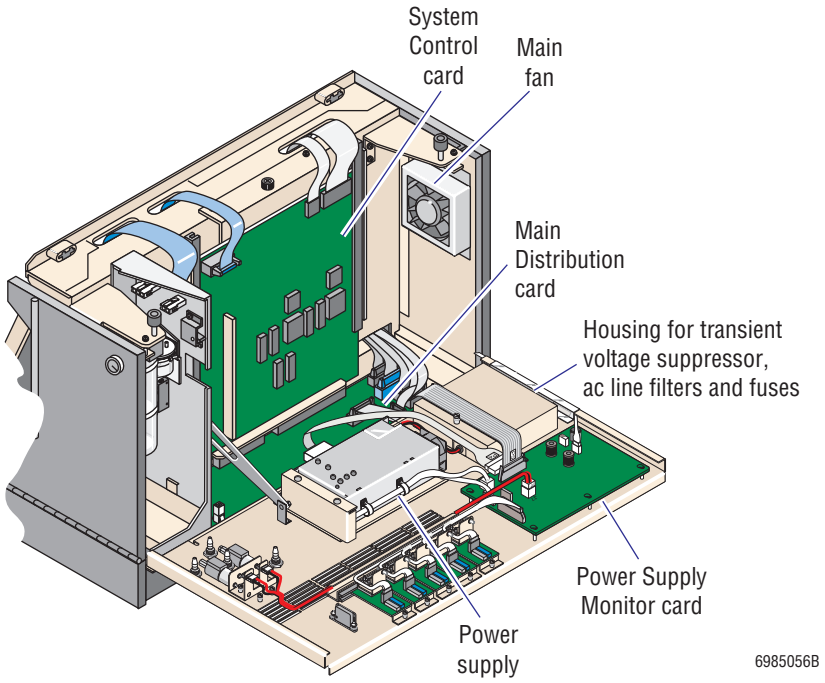
Both ac lines (live and neutral) are fused providing protection for applications where two "live" lines are used. The fuses are located on the rear panel of the SlideMaker and can be replaced by the customer.

Power Supply

Function

The power supply is a self-contained unit located on the rear door of the SlideMaker. See Figure 2.2-3.

Figure 2.2-3 Electronic Power System Components



The power supply senses and compensates automatically for the ac line voltage as specified for Voltage Tolerances, Ac Input Line Voltages, under Heading A.1, TOLERANCES AND LIMITS, allowing the instrument to operate at different line voltages without the need for manual configuration.

The power supply transforms the ac voltage to the dc voltages and currents needed by the SlideMaker, independent from the GEN•S System's or LH 750 System's power, and maintains the output regulation even with a line input variation of ±10% from nominal. The absolute maximum continuous power required by the SlideMaker is:

- +5 V ±5% at 5 A
- +24 V ±5% at 8 A
- +15 V ±5% at 2 A
- -15 V ±5% at 2 A.

Input

90 - 264 Vac

Outputs

+5 Vdc, +24 Vdc, +15 Vdc and -15 Vdc to the Power Supply Monitor card

Power Supply Monitor Card

Function

The Power Supply Monitor card is located on the rear access panel of the SlideMaker. See Figure 2.2-3.

The Power Supply Monitor card:

- Monitors the dc voltages from the power supply and provides LEDs to indicate the voltage status.
- Provides test points for the dc voltages and all critical signals.
- Provides an audible alarm to indicate a SlideMaker error condition.
- Routes scaled dc voltage signals to the System Control card via the Main Distribution card.
- Routes dc voltages to the Main Distribution card for distribution.
- Buffers pneumatic enable signals (PRES_EN\ and VAC_EN\) from the System Control card via the Main Distribution card.
- Provides the power drivers that control the two pneumatic enable valves, SOL65 and SOL66, used to isolate the SlideMaker's pneumatic system from the pneumatic system of the GEN•S System or the LH 750 System.
- Routes pneumatic monitoring signals from the Pneumatic Supply Monitor cards to the System Control card via the Main Distribution card without processing the signals.

LEDs

The Power Supply Monitor card has four LEDs, one for each dc voltage supply. These LEDs are lit when the dc voltage is within acceptable limits, indicating the power supply has no gross defect or failure. See Figure A.2-4 for the location of the LEDs. See Table A.2-9 for the acceptable voltage limits.

Test Points

The Power Supply Monitor card provides test points for the dc voltages and all critical signals. See Figure A.2-4 for the location of the test points. See Table A.2-10 for the test point signals.

Connectors

See Figure A.2-4 for the location of the connectors on the Power Supply Monitor card. See Table A.2-8 for the connector signals by pin.

Main Distribution Card

Function

The Main Distribution card is located in the rear compartment of the SlideMaker. Refer to Figure 2.2-3.

The Main Distribution card acts much like a backplane for the SlideMaker modules, distributing the majority of the electronic signals and power. Refer to Figure 2.2-2 for an overview of the power distribution.

The Main Distribution card incorporates an analog and digital ground plane layer and a power plane layer to reduce voltage drops and noise. Grounding for the Main Distribution card is provided by conductive mountings and by two wired connections in the power cable from the power supply to the card. The mountings provide RF shielding to external cable shields.

The System Control card plugs directly into the Main Distribution card; all other physical assemblies or modules are connected to the Main Distribution card by cable. Modules that require numerous signals and power use a single ribbon cable for the primary connection. Refer to the GEN•S SM SlideMaker Interconnect Block Diagram, DCN 6323239, in Chapter 6 for an overview of the interconnection between the Main Distribution card and the rest of the electrical system. For details, refer to the GEN•S SM SlideMaker Interconnect Diagram, DCN 6321624, in Chapter 6.

The Main Distribution card:

- Provides the control and data connection to the power supply via the Power Supply Monitor card.
- Routes PRES_EN\ and VAC_EN\ signals from the System Control card to the Power Supply Monitor card for control of the pneumatic enable valves.
- Routes power to and receives signals from the:
  - Power Supply Monitor card.
  - System Control card.
  - Smear/Transport Interface card.
  - Dryer Interface card.
  - Slide Ejector Interface card.
  - Basket Transport Interface card.

- Routes power to the:
  - Main fan.
  - Main Fluidics Interface card.
  - Dispense 1 Manifold card.
  - Dispense 2 Manifold card.
- Receives signals from the:
  - Power on/off switch, a logic level control for the output of the power supply.
  - Reset switch used to reset the instrument.
  - Main cover interlock switch.
- Monitors the status of the float sensor in the vacuum accumulator tank, TK3, and energizes SOL63 to drain the vacuum accumulator tank as needed.
- Provides control signals and dc voltages to the Label Printer module.
- Provides the only direct electrical interface between the SlideMaker and the GEN•S System or the LH 750 System through connector J1 on the rear panel of the SlideMaker.

  This interface routes all control and data signals to and from the GEN•S System or the LH 750 System. It supports both opto-isolated GEN•S System or LH 750 System bidirectional serial data and opto-isolated Workstation bidirectional serial data interface signals.
- Provides a serial data connection for the auxiliary service terminal through connector J2 on the rear panel of the SlideMaker. This interface supports incoming RXD signals from the System Control card and outgoing TXD signals.

  Note: The Auxiliary Service Terminal is used for service and development activities, and for communication with the optional SlideStainer.

Connectors and Test Points

The connectors and test points for the Main Distribution card are shown in Figure A.2-3 and described in Tables A.2-5 and A.2-6, respectively.

Power System Interconnections

For an overview of how the components within the electronic power system are interconnected, refer to the SlideMaker Interconnect Block Diagram in Chapter 6. For more detail, refer to the SlideMaker Interconnect Diagram in Chapter 6.

Power Failure

In the case of a power failure, the PWR_FAIL\ signal from the Power Supply Monitor card warns the system at least 20 milliseconds before the power failure affects it. (A logic LOW indicates ac power to the system has failed.) This provides sufficient time for the system to save the information needed to recover from a power outage.

2.3 FLUIDIC SYSTEM

Summary

The fluidic system consists of the pneumatic power system and the reagent handling system.

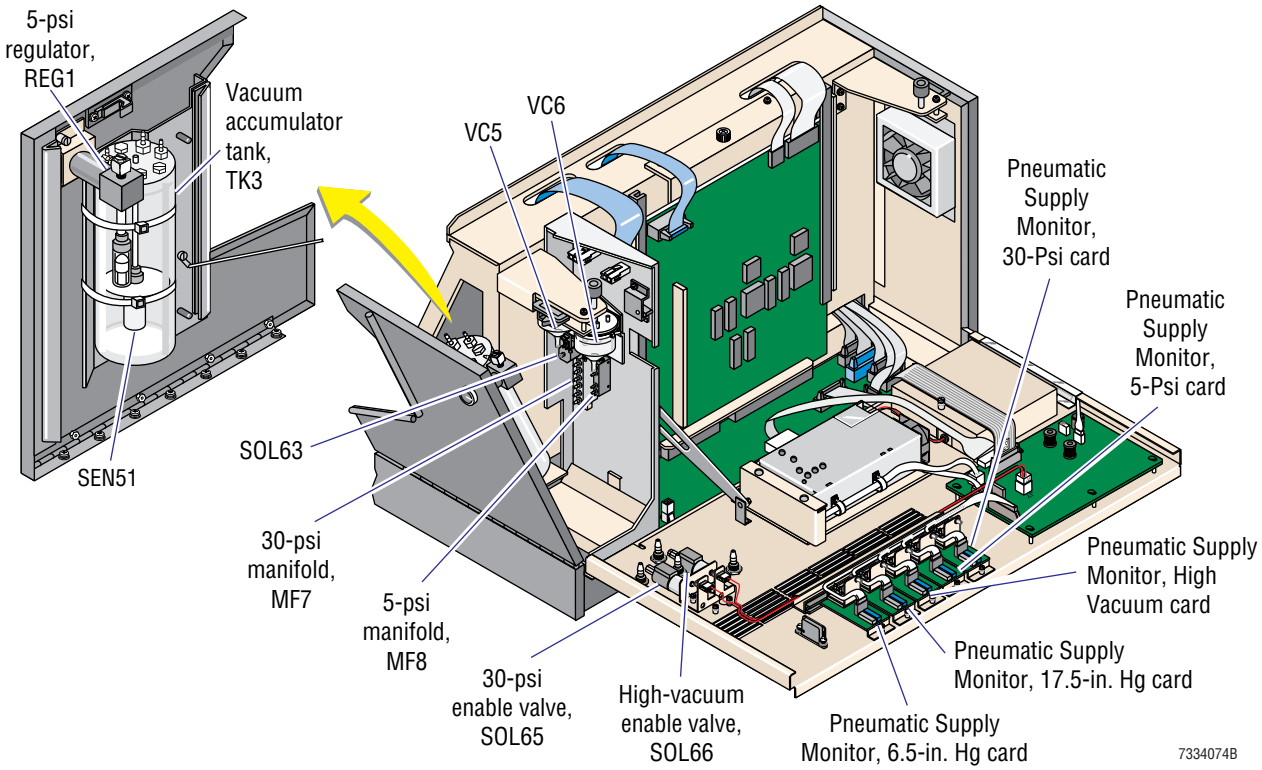
- The pneumatic power system acquires 30 psi and high vacuum from the Analytical Station and regulates, monitors and distributes the pneumatic power.
- The reagent handling system acquires diluent and cleaning agent from the Analytical Station's supply, distributes the reagents, collects the waste liquids, and dispenses the waste into the Analytical Station's waste lines.

This section describes the components and functions of the pneumatic power system and the reagent handling system, including the Pneumatic Supply Monitor Cards, the Main Fluidics Module and the Main Fluidics Interface Card.

Pneumatic Power Acquisition

The SlideMaker acquires its 30 psi and high, unregulated vacuum from the Analytical Station; the pneumatic access lines for the SlideMaker are attached to T-fittings tapped into the 30-psi and high-vacuum supply lines from the Power Supply to the Diluter. The other ends of the 30-psi and high-vacuum access lines are attached to "push to connect/disconnect" fittings on pneumatic enable valves at the rear of the SlideMaker. See Figure 2.3-1.

Figure 2.3-1 Pneumatic Power System Components in the Rear and Right Side of the SlideMaker



Pneumatic Enable Valves

The pneumatic enable valves, SOL65 and SOL66, are three-way solenoid valves used to control the acquisition of 30 psi and high vacuum, respectively, from the Analytical Station. In the de-energized state, the pneumatic enable valves block the pneumatic input from the Analytical Station and vent the distribution lines. In the energized state, the pneumatic enable valves route the 30 psi and high vacuum into the SlideMaker system.

To ensure the Analytical Station is not affected by the powerup of the SlideMaker, the SlideMaker only energizes the pneumatic enable valves when the Analytical Station is idle.

To prevent pneumatic power surges to the Analytical Station, you should only power down the SlideMaker when the Analytical Station is idle.

The Power Supply Monitor card contains the drivers for the pneumatic enable valves. To energize the pneumatic enable valves, the System Control card places the PRES_EN\ and VAC_EN\ signals to the Power Supply Monitor card to a logic LOW level. Initially full power is applied to the pneumatic enable valves; then, about 100 milliseconds later, the power is reduced to a nominal 70%.

Note: The driver numbers for SOL65 and SOL66 are 79 and 80, respectively.

If a pneumatic leak develops in the SlideMaker, you can use the Solenoid Test screen (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST**) to remove power from the pneumatic enable valves, allowing the Analytical Station to continue processing.

Pressure Regulation and Distribution

The SlideMaker uses two pressures in its system, 30 psi and 5 psi. An adjustable regulator, REG1 (Figure 2.3-1), regulates the 30 psi to 5 psi. Two pressure distribution manifolds, MF7 and MF8 (Figure 2.3-1), route the 30 psi and 5 psi via fluidic quick disconnects to the SlideMaker modules.

30 Psi

The 30 psi is routed from the 30-psi enable valve, SOL65, to:

- Pneumatic Supply Monitor, 30-Psi card for monitoring.
- 30-psi distribution manifold, MF7, for distribution to the:
  - 5-psi regulator, REG1.
  - Main Fluidics module, Cassette Input Queue module, Slide Ejector module, Cassette Output Queue module, Slide and Smear module, Dispense module, and Basket Queue module.

    Note: The Sample Access and Reservoir module acquires its 30 psi from the Diluter.

30 psi is used to:

- Move mechanical components such as cylinders and pinch valves.
- Dispense diluent and cleaning agent from the reagent tank.
- Dry the aspiration and reservoir lines.

5 Psi

The 5-psi regulator, REG1, regulates 30 psi to 5 psi and routes the 5 psi to the 5-psi distribution manifold, MF8, for distribution to the:

- Pneumatic Supply Monitor, 5-Psi card for monitoring.
- High vacuum enable valve, SOL66.
- Main Fluidics module and Dispense module.

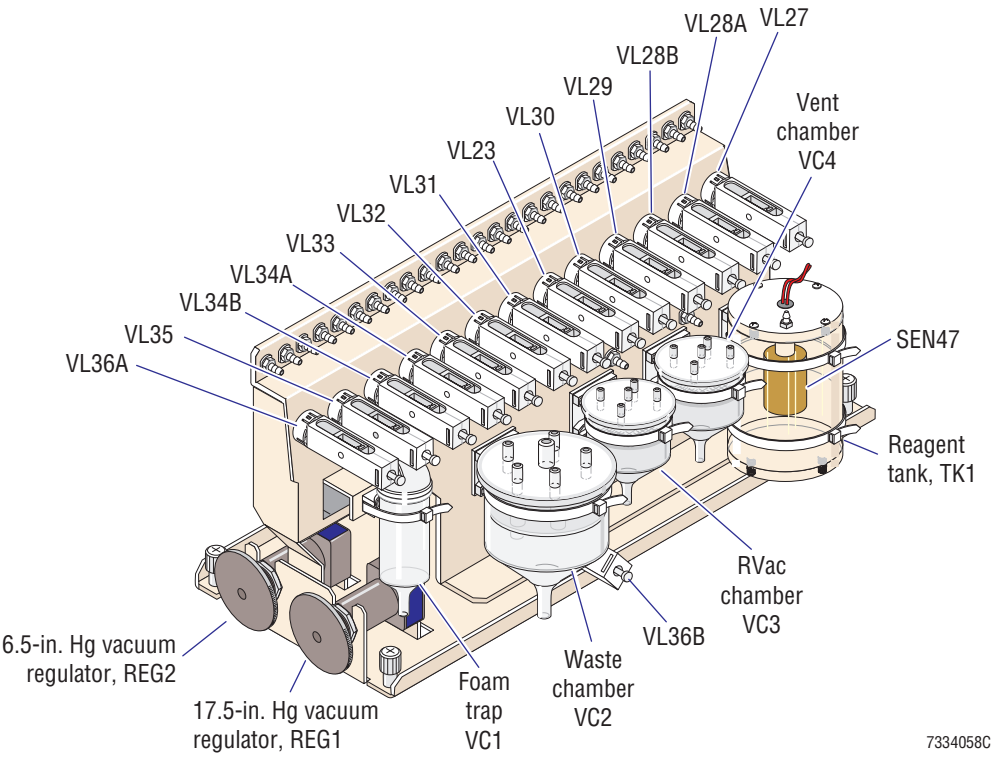
5 psi is used to:

- Push waste from the SlideMaker to the Analytical Station's waste container.
- Push blood samples from the reservoirs to the dispense line.

Vacuum Regulation and Distribution

The SlideMaker uses three vacuums in its system: high (unregulated), 17.5 in. Hg, and 6.5 in. Hg. Two adjustable regulators in the Main Fluidics module, REG1 and REG2 (Figure 2.3-2), regulate the high vacuum to 17.5 in. Hg and 6.5 in. Hg, respectively.

Figure 2.3-2 Main Fluidics Module, Front View



High Vacuum

The high vacuum is routed from the high-vacuum enable valve, SOL66, to:

- Pneumatic Supply Monitor, Vacuum card for monitoring.
- Vacuum accumulator tank, TK3, for vacuum accumulation and distribution via VC5, VC6, and fluidic quick disconnects to the:
  - Main Fluidics module
  - Slide and Smear module

High vacuum is used to:

- Fill the reagent tanks.
- Collect waste liquids.
- Dry the dispense probe.
- Pick up the slide from the Slide Ejector module
- Hold the slides in place during travel in the SlideMaker.

17.5 In. Hg Vacuum

The 17.5-in. Hg vacuum regulator, REG1, regulates the high vacuum to 17.5 in. and routes the 17.5-in. Hg vacuum to the:

- Pneumatic Supply Monitor, 17.5-in. Hg card for monitoring.
- RVac chamber, VC3, for accumulating the vacuum and maintaining its stability during use. The RVac chamber routes the 17.5 in. Hg to the Dispense module.

The 17.5 in. Hg vacuum is used to aspirate blood samples from the specimen tubes.

6.5 In. Hg Vacuum

The 6.5-in. Hg vacuum regulator, REG2, regulates the high vacuum to 6.5 in. and routes the 6.5 in. Hg vacuum to the:

- Pneumatic Supply Monitor, 6.5-in. Hg card for monitoring.
- RVac chamber, VC3, for accumulating the vacuum and maintaining its stability during use. The RVac chamber routes the 6.5 in. Hg to the Dispense module.

The 6.5 in. Hg vacuum is used:

- To pull the leading edge of the blood sample toward the reservoir during generation of a bubble in the middle of the sample.
- To advance the blood sample through the reservoir.
- In tandem with atmospheric pressure to mix the blood sample in the reservoir.

Vacuum Accumulator Tank

The vacuum accumulator tank, TK3 (Figure 2.3-1), accumulates high vacuum to reduce peak consumption load on the Analytical Station's Pneumatic Power Supply and traps any liquid pulled into the vacuum lines.

The vacuum accumulator tank houses a float sensor, the vacuum reservoir full sensor, SEN51, which detects any liquid pulled into the vacuum accumulator tank as the result of a fault condition such as a:

- Plugged waste chamber.
- Defective reagent reservoir level sensor.
- Stuck refill solenoid. (Solenoid fails to close and remove vacuum when level sensor indicates a full reservoir.)

If liquid enters the vacuum accumulator tank and the vacuum reservoir full sensor fails, a mechanical float valve in the tank rises with the liquid and seals off the vacuum supply port, preventing liquid from entering the vacuum isolation supply valve and ultimately the Analytical Station's Pneumatic Power Supply. The pneumatic monitoring system of the SlideMaker detects the resultant loss of vacuum.

To remove liquid from the vacuum accumulator tank, the vacuum enable valve is de-energized, blocking the high vacuum input and routing 5 psi to the top of the vacuum accumulator tank. At the same time, SOL63 is energized, opening the path from the vacuum accumulator tank to the Analytical Station's waste container. To ensure the Analytical Station is not affected, the vacuum accumulator tank is only emptied when the Analytical Station is idle.

Color Coding

To make it easier to follow pneumatic lines when servicing the SlideMaker, the pneumatic tubings and connectors are color coded.

- Green = 30 psi
- Red = 5 psi
- Yellow = high vacuum
- Blue = 17.5 in. Hg
- Black = 6.5 in. Hg.

Pneumatic Supply Monitor Cards

The SlideMaker uses five Pneumatic Supply Monitor cards to monitor the pneumatic outputs, one for each vacuum and pressure used in the system. The Pneumatic Supply Monitor cards are located on the rear door of the SlideMaker. See Figure 2.3-1.

The Pneumatic Supply Monitor cards use a solid-state differential pressure transducer, U2 (a diaphragm activated Wheatstone four-arm bridge sensor), connected to an instrumentation amplifier, U1, with trimming circuits to adjust zero and span values. The pressure differential unbalances the bridge causing a small output voltage differential proportional to the pressure differential. A voltage reference circuit is employed to ensure that power supply variations do not affect the output levels. A sensor zero trimmer circuit allows calibration to remove initial offset. This trimmer is powered by the voltage reference device to ensure that power supply variations do not affect the calibration. The instrumentation amplifier amplifies the differential voltage and outputs a ground referenced voltage proportional to the voltage differential.

The System Control card quantifies the scaled voltages and routes the information to the Display module for display on the Pneumatic Power Supplies screen. If any of the vacuums or pressures fall outside an acceptable range, the System Control card also generates an error message.

Reagent Acquisition

The SlideMaker acquires its diluent and cleaning agent from the Analytical Station's supply. The diluent access line for the SlideMaker is either attached to the pickup tube in the diluent container for the Analytical Station or to a T-fitting in the diluent line from that pickup tube, depending on the configuration of the Analytical Station. The cleaning agent access line for the SlideMaker is attached to the pickup tube in the cleaning agent container for the Analytical Station. The other ends of the diluent and cleaning reagent access lines are attached to "push to connect/disconnect" fittings on the rear of the SlideMaker.

Reagent Distribution

From the rear of the SlideMaker, the diluent and cleaning agent are routed to the reagent tank, TK1 (Figure 2.3-2), in the Main Fluidics module. High vacuum pulls diluent into the reagent tank for the Startup cycle and normal operations, and pulls cleaning agent into the reagent tank for the Shutdown cycle. During the SlideMaker cycles, 30 psi dispenses reagent from the reagent tank to backwash the aspiration lines and the inside of the dispense probe, and to rinse the outside of the dispense probe.

The reagent tank contains a float sensor for monitoring the level of reagent. When the diluent level in the reagent tank is low, SOL28 is energized, activating VL28A to supply vacuum for refilling the tank and VL28B to route diluent to the reagent tank. If the reagent full sensor, SEN47, continues to indicate the reagent tank is not full for a given length of time, the System Control card generates an error message.

For the Shutdown cycle, SOL29 is energized, activating VL29 to switch the reagent source for the reagent tank from diluent to cleaning agent, and SOL28 is energized to supply vacuum for filling the reagent tank. If the reagent full sensor, SEN47, indicates the reagent tank is not full of cleaning agent for a given length of time, the System Control card generates an error message.

To decontaminate the SlideMaker, a bleach solution is connected to the disinfect port at the rear of the SlideMaker. In the Decontamination cycle, SOL30 is energized, activating VL30 to switch the reagent source for the reagent tank from cleaning agent to bleach solution, and SOL28 is energized to supply vacuum for filling the reagent tank.

Waste Collection

The waste chamber in the Main Fluidics module uses high vacuum to collect waste from the rinse block, RB1; the RVac chamber, VC3; and the vent chamber, VC4; and uses 5 psi to dispense the waste out the waste tubing at the rear of the SlideMaker into the Analytical Station's waste line to the waste container. The waste tubing is attached to "push to connect/disconnect" fittings on the rear of the SlideMaker.

If the waste chamber overflows, the liquid is collected in the foam trap. If the foam trap overflows, the liquid is collected in the vacuum accumulator tank, TK3, and then dispensed into the Analytical Station's waste line. Refer to Vacuum Accumulator Tank in this section.

Main Fluidics Module

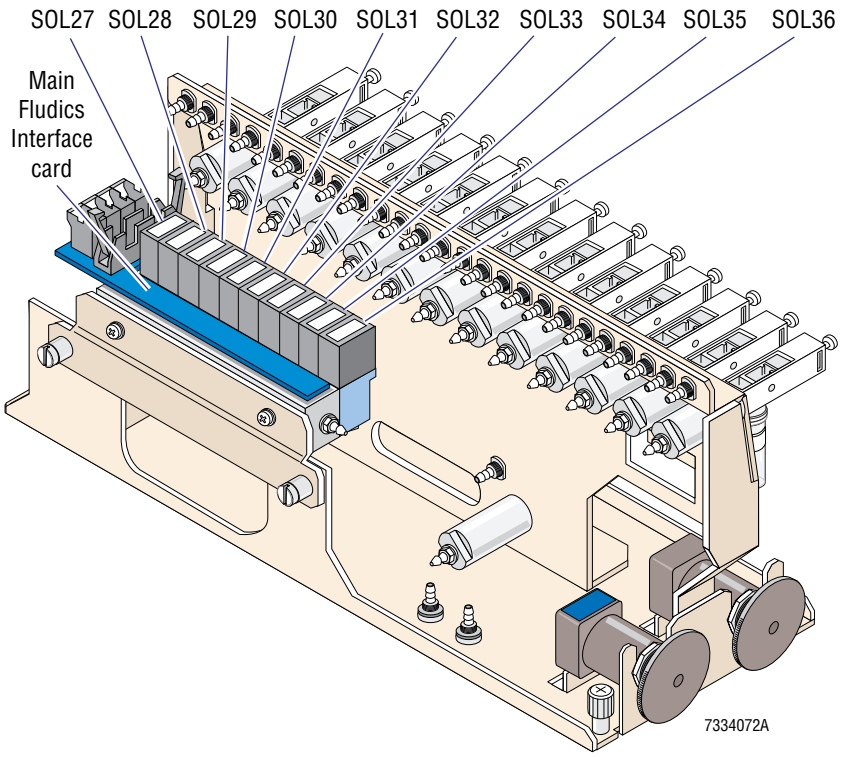
The Main Fluidics module is located on the left side of the SlideMaker, in front of the Printer module and behind the Basket Queue module. Refer to Figure 2.1-2.

The Main Fluidics module is a centralized source of pneumatic power, reagents, and waste collection for the Dispense module. The functions of the Main Fluidics module components (Figures 2.3-2 and 2.3-3), excluding the solenoids, pinch valves, and associated fittings and tubing, are:

- REG1 - Regulates high vacuum to 17.5 in. Hg.
- REG2 - Regulates high vacuum to 6.5 in. Hg.
- RVac chamber, VC3 - Accumulates and stores the regulated vacuum during use.
- Reagent tank, TK1 - Stores and dispenses diluent during normal operation and cleaning agent during the shutdown cycle.
- Waste chamber, VC2 - Collects and dispenses waste.
- Foam trap, VC1 - Collects overflow from waste chamber.
- Vent chamber, VC4 - Provides an enclosed source of atmospheric pressure.

For a list of the functions of the solenoids and associated pinch valves, refer to Table A.3-1.

Figure 2.3-3 Main Fluidics Module, Rear View



Main Fluidics Interface Card

The Main Fluidics Interface card is located on the Main Fluidics module. Refer to Figure 2.3-3.

The Main Fluidics Interface card is an interface between the electrical components in the Main Fluidics module and the Main Distribution card. The Main Fluidics Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from the System Control card.
- Data signals to the System Control card.

The solenoids in the Main Fluidics module are mounted directly on the Main Fluidics Interface card and are changed as an assembly.

Solenoids

Solenoid valves are used throughout the SlideMaker to activate mechanical components, such as pinch valves and cylinders, and to route liquids, vacuums and pressures. See Table A.3-1 for a list of the solenoids, with their functions and location figure references.

You can test the solenoids, using the Solenoid Test screen (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST**). For details about the Solenoid Test screen, refer to Table 4.2-1.

CAUTION Risk of damage to driver circuitry. Connecting or disconnecting a solenoid while the power is ON can damage the driver circuitry. Power down the SlideMaker before connecting or disconnecting a solenoid.

The drivers for the solenoids can be damaged by power fluctuations. If you need to disconnect a solenoid to check it further, or to replace it, always power down the SlideMaker first.

Sensor Summary

The fluidic system uses five Pneumatic Supply Monitor cards to monitor the pneumatic power (refer to Pneumatic Supply Monitor Cards in this section) and two float sensors to monitor the liquid levels. The float sensors used by the fluidic system are listed in Table 2.3-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.3-1 Fluidic System Sensors

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
47	Reagent full See Figure 2.3-2	Magnetic reed switch Open = reservoir full of liquid	Main Fluidics Interface	A19J3	J12, 13
51	Vacuum reservoir full See Figure 2.3-1	Magnetic reed switch Open = reservoir full of liquid	Main Distribution	J18	N/A

2.4 SYSTEM CONTROL

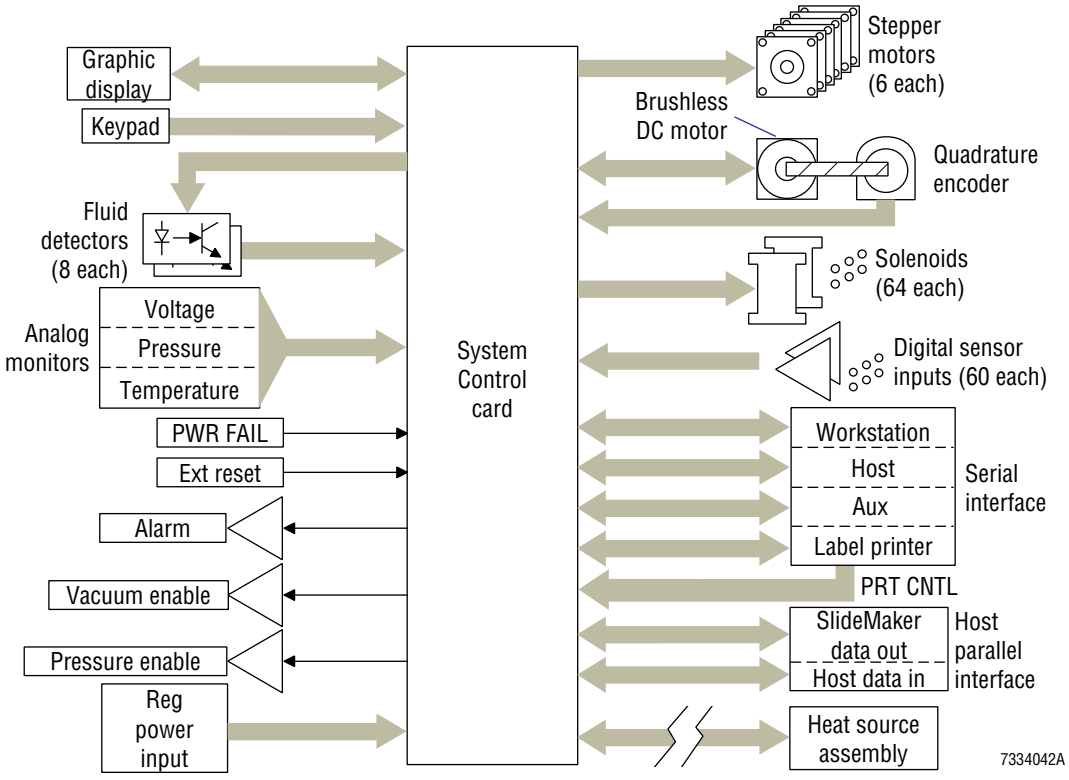
Summary

Control of the SlideMaker is accomplished through two components:

- The System Control card runs the SlideMaker software, controls the mechanical components and quantifies the monitored pneumatic readings and voltages for display.
- The Keypad and Display module displays the status of the SlideMaker and provides user interface with the SlideMaker.

Figure 2.4-1 provides an overview of system control. This section describes the System Control Card and the Keypad and Display Module. This section also describes the SlideMaker reset sequence (System Reset).

Figure 2.4-1 System Control Block Diagram



System Control Card

Function

The System Control card is located in the rear compartment of the SlideMaker and plugs directly into two board-to-board connectors on the Main Distribution card. Refer to Figure 2.2-3.

The System Control card:

- Executes the software program residing in the SlideMaker.
- Provides serial and parallel communications with the GEN•S System or the LH 750 System.
- Controls and interrogates the mechanical components within the SlideMaker, such as the sensors, solenoids, motors, fluid detectors and label printer.
- Measures the ambient temperature and controls the heat generated by the heatsink assembly to dry the smeared slides.
- Quantifies scaled system voltages and pressures monitored within the SlideMaker.
- Maintains non-volatile time, date and calibration parameters within the SlideMaker.
- Generates error messages.

Processor "A" and Processor "B"

The System Control card uses two micro-control subsystems, processor "A" and processor "B," to control various functions of the SlideMaker. Each processor includes program and data memory plus functionally specific hardware. Communications between the two subsystems is implemented via a bidirectional serial interface.

The functions of the System Control card can be grouped into three categories: functions performed by processor "A" (Figure 2.4-2), functions performed by processor "B" (Figure 2.4-3), and functions performed independently of the processors.

- Processor "A" functions
  - Provides serial and parallel communications with the GEN•S System or the LH 750 System
  - Controls and interrogates the mechanical components within the SlideMaker, such as the sensors, solenoids, motors, fluid detectors and label printer
  - Maintains non-volatile time, date and calibration parameters within the SlideMaker
  - Generates error messages.
- Processor "B" functions
  - Provides all screen displays
  - Quantifies scaled system voltages, pressures, and temperatures monitored within the SlideMaker
  - Generates error messages.
- Processor independent functions
  - Measures the ambient temperature and controls the heat generated by the heatsink assembly to dry the smeared slides
  - Generates reference voltages
  - Controls system reset.

SlideMaker Software

The software program for the SlideMaker is contained as reprogrammable flash memory on two EPROMs on the System Control card, U45 and U72. The software program is transferred to processor"A" and processor "B" during system reset.

Figure 2.4-2 System Control Card, Processor "A" Block Diagram

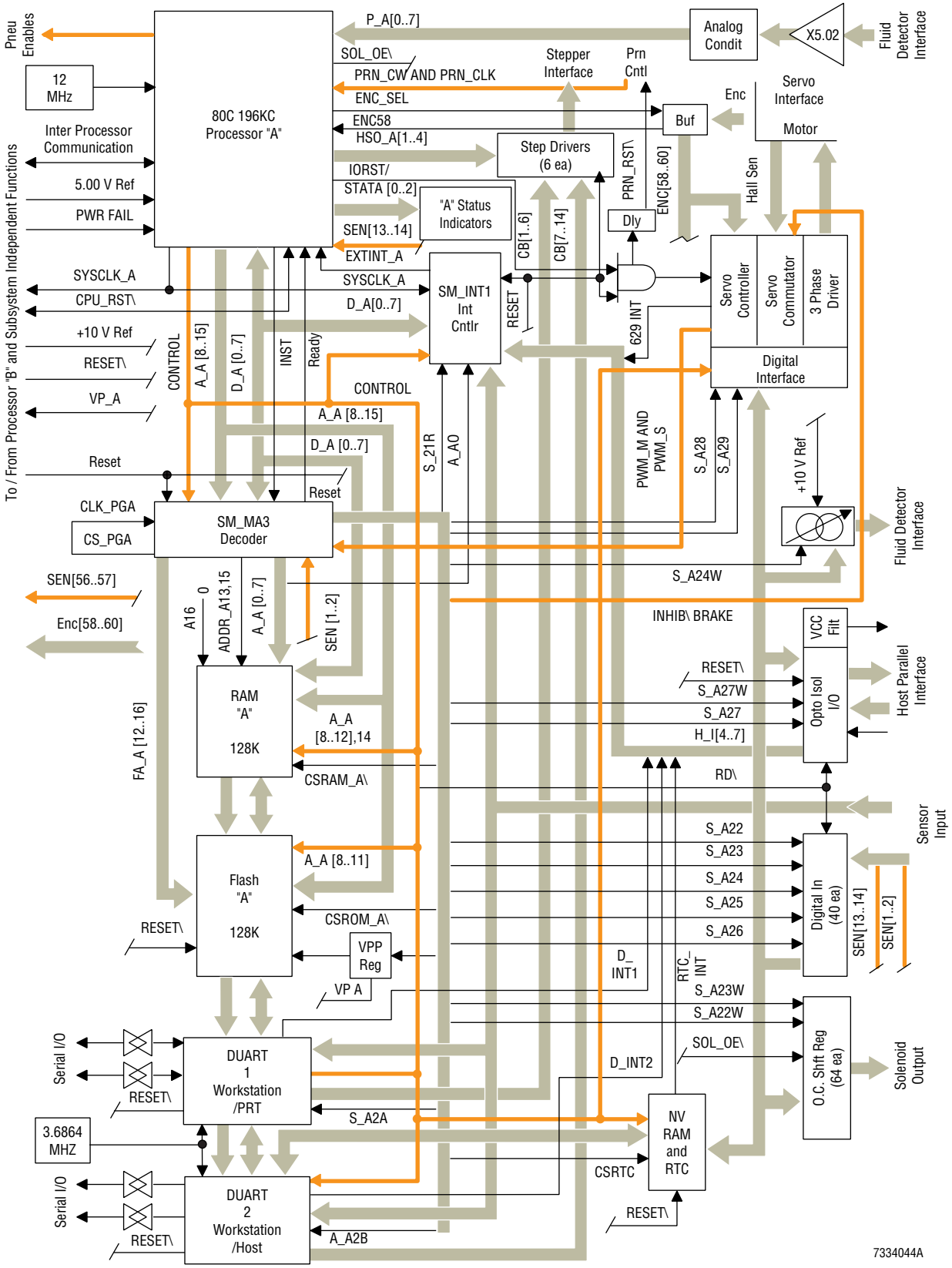
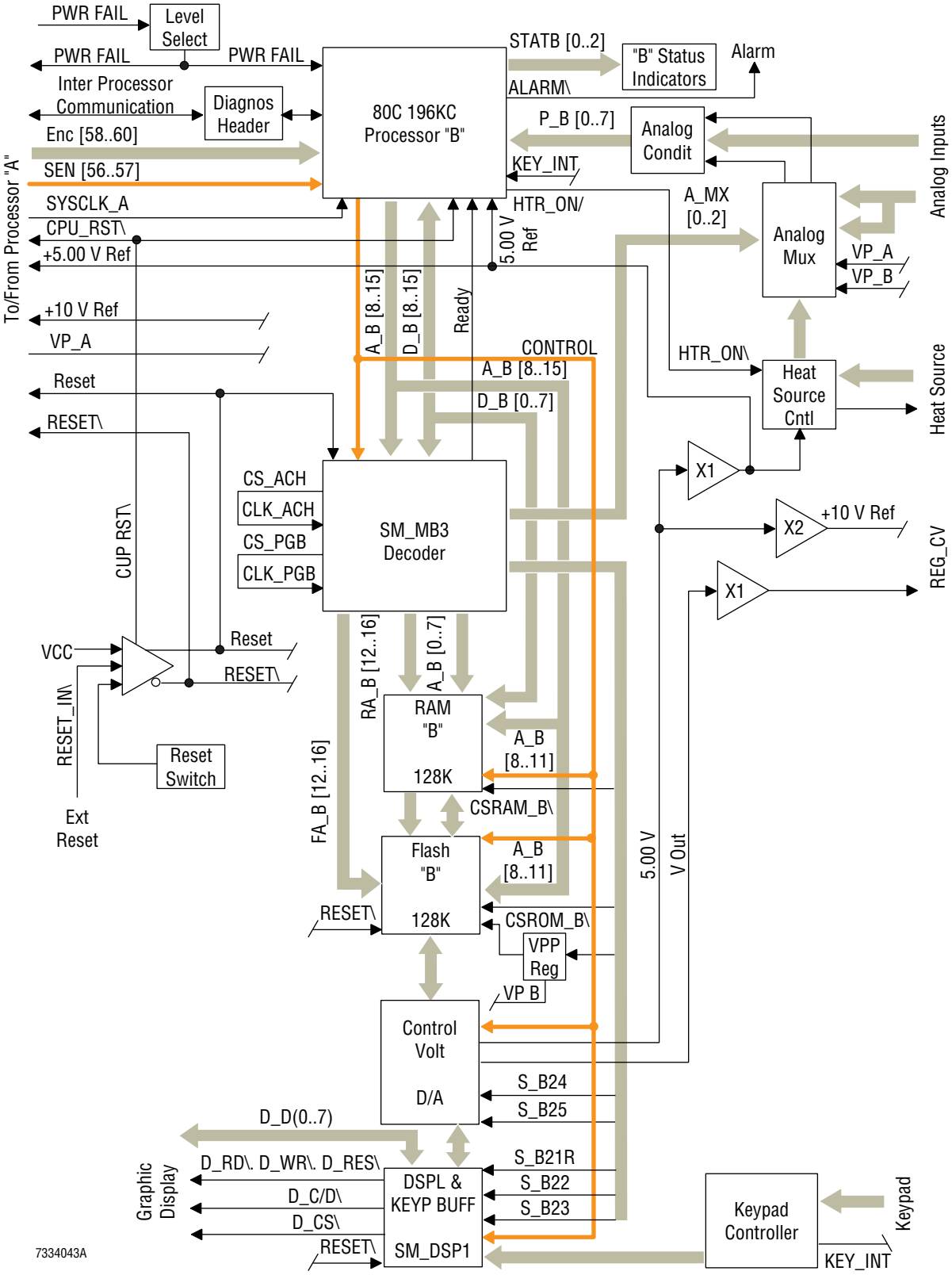


Figure 2.4-3 System Control Card, Processor "B" Block Diagram



LEDs

The LEDs for the System Control card are shown in Figure A.2-7 and described in Table A.2-16.

Jumpers

The control for processor "B", whose flash chip only contains screen information, comes from the flash chip for processor "A." Two jumpers on the System Control card enable this communication from processor "A" to processor "B." The jumper locations are shown in Figure A.2-7. For normal operation, set the jumpers as described for System Control card, Jumpers, under Heading A.2.

Connectors

All power and most signals to the System Control card are transferred to and from the System Control card from the Main Distribution card through the two board-to-board connectors, P1/J1 and P2/J2. The exceptions to this are the servo motor and the fluid detector signals:

- The servo motor is connected directly to the System Control card to avoid the generation of additional system noise from the high switched currents required by the motor.
- The signals from the eight fluid detectors pass through the Smear/Transport Interface card without modification and are routed to the System Control card on a dedicated cable. Separating the fluid data signals from all other signals enables high quality signal transfer with minimum noise pickup.

A ground strap from the Display module is attached to the conductive inner surface of the main SlideMaker cover to provide EMI and RFI shielding as well as antistatic protection to the System Control card.

The connectors for the System Control card are shown in Figure A.2-7 and described in Table A.2-15.

Test Points

The test points used for troubleshooting the System Control card are shown in Figure A.2-7 and described in Table A.2-17.

Keypad and Display Module

The Keypad and Display module is mounted on the front cover of the SlideMaker (Figure 2.1-1). The bottom of this module is secured to the front cover with latching pins so you can unlatch the module and swing it down for viewing when the cover is open.

The Keypad and Display module is the interface between the SlideMaker and the operator. It houses a 240 x 128 dot graphic, backlighted panel with eight pressure sensitive switches that:

- Displays messages and information about the SlideMaker.
- Allows the operator to -
  - Respond to instrument messages.
  - Request menu options. For a summary of the menu options available, refer to Figure A.5-1. For a description of the service options, refer to Heading 4.2.

The Keypad and Display module is connected to the System Control card (Figure 2.2-3).

System Reset

Initiating a Reset

Note: The SlideMaker can only do a complete reset when the GEN•S System or the LH 750 System is in the READY state.

You can initiate a complete reset of the SlideMaker by:

- Using the power on/off switch, S2, on the front of the SlideMaker to turn the power off and on.
- Leaving the power on/off switch, S2, on, and using the main power switch, S1, on the rear of the SlideMaker to turn the power off and on.
- Pressing the RESET button on the System Control card.

Pressing the reset button on the front of the SlideMaker either clears pending errors following operator intervention or initiates a complete reset, depending on the state of the SlideMaker when the button is pressed.

Boot Mode

Resetting the SlideMaker initializes the hardware, setting it to a default state; checks the memory paths; and allows processor “A” and processor “B” to execute the program from the “boot block” of memory, about 8 KB of noneraseable flash memory in the flash memory chips (EPROMs U45 and U72).

The primary purpose of this condition, known as the Boot mode, is to allow processor “A” and processor “B” to transfer the “boot handler software” from flash memory to RAM memory. After transferring the boot handler software, the SlideMaker returns to the Normal mode.

Normal Mode

In the Normal mode, the SlideMaker uses the boot handler software to:

1. Transfer part of the remaining 128 K of code (operating software) from processor "A"s flash memory chip, through processor "A" and processor "B," to the RAM memory chip for processor "B."

   Note: The operating software for processor "B" is stored on the flash memory chip for processor "A." The flash memory chip for processor "B" contains screen information only.
2. Transfer part of the remaining 128 K of code (operating software) from processor "A"s flash memory chip, through processor "A," to the RAM memory chip for processor "A."

In the Normal mode, processor "A" has direct access to 56 K of RAM together with an additional 48 K of overlay and data only RAM, and processor "B" has direct access to 56 K of RAM plus indirect access to an additional 72 K of RAM.

System Initialization

After transferring the operating software from flash memory to RAM memory, the SlideMaker uses the operating software to reset the instrument functions as defined in the software program.

2.5 SAMPLE ACQUISITION SYSTEM

Summary

The sample acquisition system:

1. Aspirates a blood from the specimen tube through the vent side of the needle in the Analytical Station.
2. Transfers the sample to one of two reservoirs.
3. Holds and mixes the sample.
4. Transfers the sample from the reservoir to the dispense probe, priming the dispense line with a portion of the sample.
5. Dispenses a measured drop of the blood sample onto a slide for processing.

The sample acquisition system also rinses and dries the aspiration and dispense lines between samples to limit dilution and carryover.

Two modules, working in tandem, perform the functions of the sample acquisition system: the Sample Access and Reservoir module and the Dispense module.

This section describes the components and functions of the sample acquisition system, including the Sample Access and Reservoir Module, Dispense Module, Dispense Probe Mechanism, Rinse Block, Fluid Detectors and the Dispense 1 Manifold and Dispense 2 Manifold Cards.

Function

As you read this section, refer to the Pneumatic/Hydraulic Schematic, DCN 6323138, in Chapter 6, to follow the fluidic flow, and to Figures 2.5-1 and 2.5-2 to locate the discussed components in the Sample Access and Reservoir module and in the Dispense module, respectively.

Aspirating a Blood Sample

To generate a slide, the SlideMaker needs the following information from the Analytical Station: the decision to make a slide, verification of the patient ID, and the sample analysis results for determining the appropriate smear velocity and wicking time. To accommodate the situation where the Analytical Station starts sampling a blood before the results of a previous blood are available, the SlideMaker uses two reservoirs alternately to draw, hold and mix the samples. While the first sample is held and mixed in one reservoir until the SlideMaker receives the needed information from the Analytical Station, the other reservoir is cleaned and dried in preparation for a blood sample from the specimen tube currently in the Sampling Station of the Diluter.

For the aspiration process to begin, the Analytical Station:

1. Confirms that aspiration from the specimen tube into the Diluter was acceptable.
2. Sends a command to the SlideMaker to aspirate a sample.

   Note: The Analytical Station does not send a command to the SlideMaker to aspirate when it is processing calibrator or control material.

Figure 2.5-1 Sample Access and Reservoir Module Components

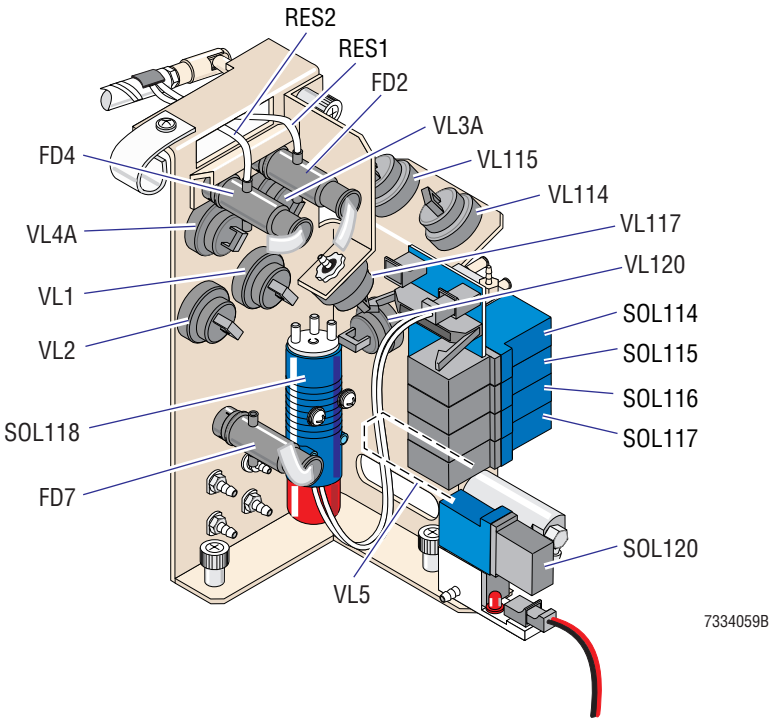
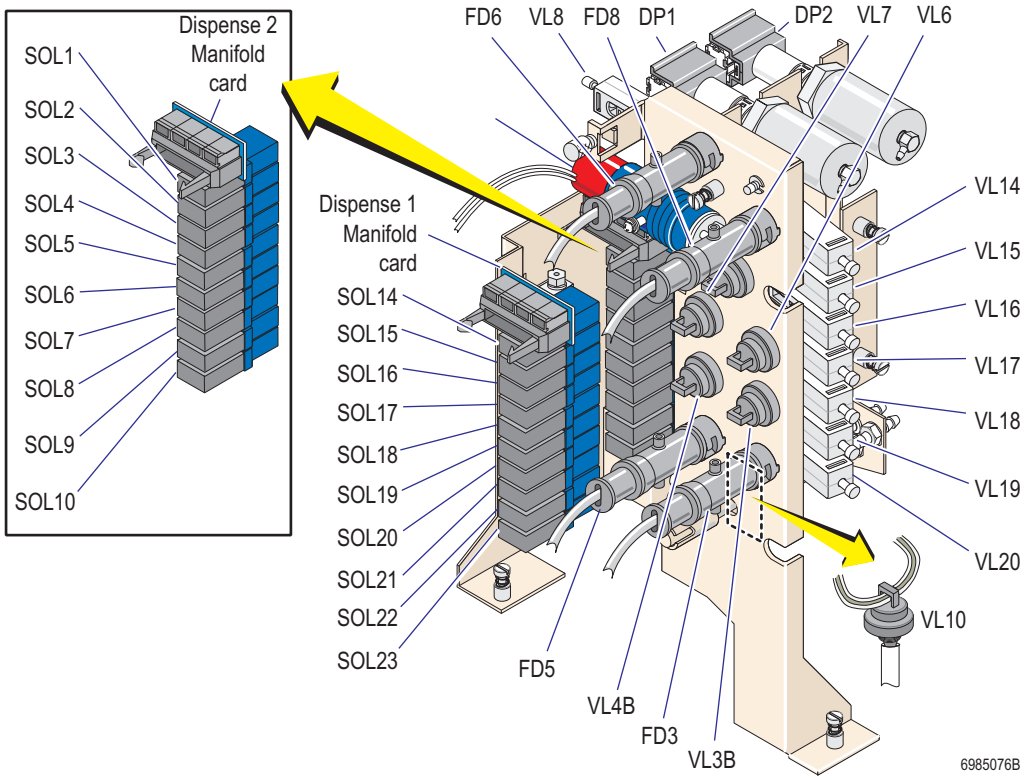


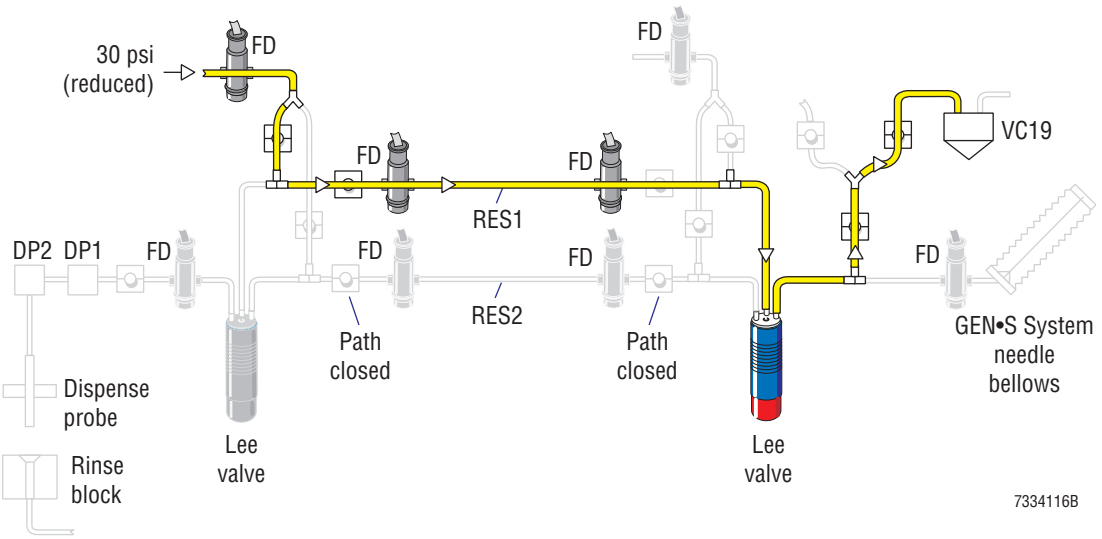
Figure 2.5-2 Dispense Module Components



Once the SlideMaker receives the command to aspirate, SOL22 routes 30 psi (reduced) through the sample reservoir and the aspiration line to the Analytical Station's vent chamber, VC19, to remove any diluent that could contribute to sample dilution. See Figure 2.5-3. During this drying process, fluid detectors FD8 plus FD2 and FD3 for RES1, or FD4 and FD5 for RES2, are used to confirm the presence of air.

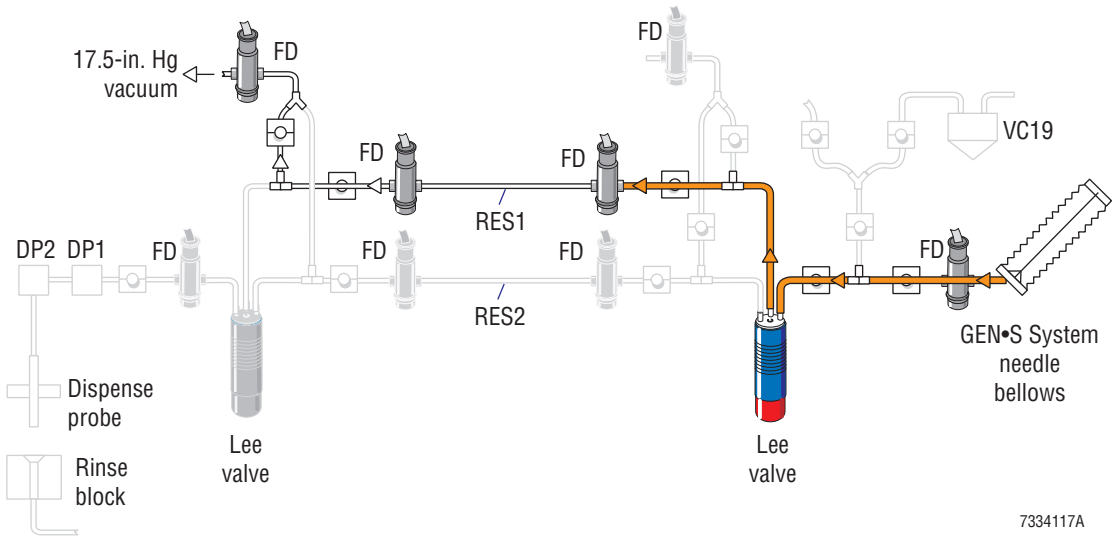
Note: On current SlideMakers and SlideMakers modified to include the pinch valve VL10, the pressure line from SOL22 is routed through VL10. VL10 is a fail-safe. If SOL22 fails in the open postion, VL10 will prevent the 30 psi from reaching the needle vent line.

Figure 2.5-3 Drying the Aspiration Line for RES1



To aspirate a sample, SOL118 opens the pathway to the correct reservoir, and VL14 routes 17.5 in. Hg to the prepared reservoir to draw sample from the specimen tube, through the needle, out the vent tubing and into the Sample Access and Reservoir module. See Figure 2.5-4. During the SlideMaker's aspiration, the specimen tube is not vented.

Figure 2.5-4 Sample Aspiration to RES1



When the fluid detector FD1 and, FD2 for RES1, or FD4 for RES2, detect blood in the aspiration line, they trigger activation of VL3A and VL3B for RES1or VL4A and VL4B for RES2, closing the aspiration pathway and stopping the flow of blood. The volume of blood sample aspirated is about 250 µL.

Note: During aspiration, FD2 or FD4 detects the leading edge of the blood sample, and FD1 confirms the minimum volume is aspirated.

During the aspiration time, if the SlideMaker does not sense blood in the aspiration line, it marks the sample as incomplete and does not make a smear. Three successive incomplete samples generate an error message and stop the SlideMaker.

Transferring the Blood Sample to a Reservoir

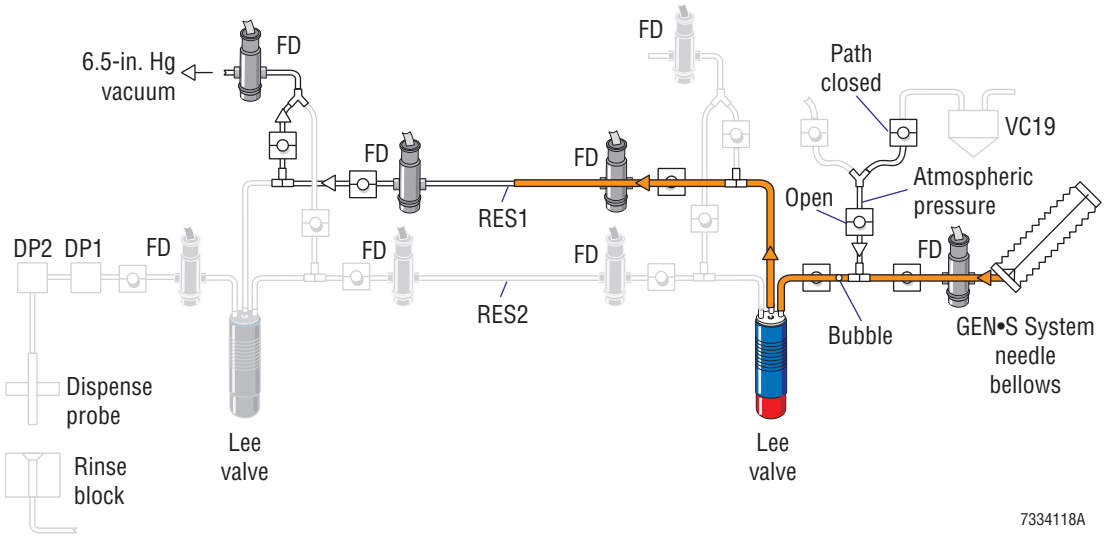
Before transferring the blood sample to the reservoir, the SlideMaker introduces an air bubble into the middle of the blood sample, effectively dividing it into two samples, one for priming the lines and one for making the smear. The length of the air bubble varies, depending on the viscosity of the blood specimen.

To introduce the air bubble:

1. VL32 is activated, switching the 17.5 in. Hg at the reservoir to 6.5 in. Hg.
2. VL3A and VL3B for RES1 or VL4A and VL4B for RES2 is reopened, putting 6.5 in. Hg at the front of the blood sample.
3. VL115 is opened, releasing atmospheric pressure into the sample at FT2. The atmospheric pressure displaces the sample forward at FT2 toward the reservoir, producing the air bubble.

See Figure 2.5-5.

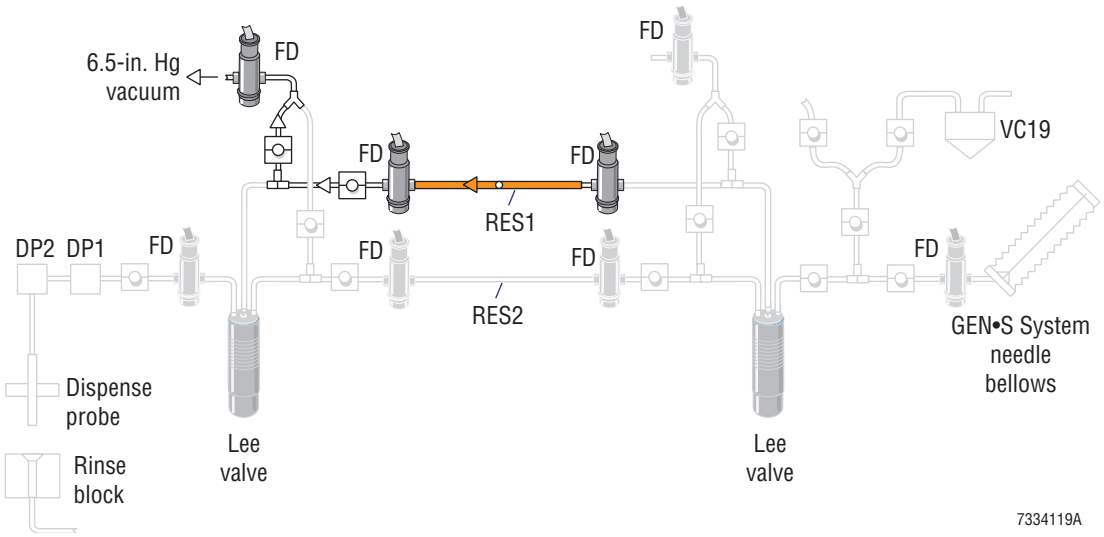
Figure 2.5-5 Introducing an Air Bubble into the Sample Line



After the bubble is produced, high vacuum (from VL33 via the Analytical Station's vent chamber, VC19) is used to remove any residual atmospheric pressure in the line between VL115 and FT2. Removing the residual pressure prevents it from generating small bubbles in the trailing segment of the aspirated sample as the sample is advanced into the reservoir.

Following the formation of the bubble, the 6.5 in. Hg continues to pull the divided blood sample into and through the reservoir until FD3 for RES1, or FD5 for RES2, detects the leading edge of the sample and triggers the closing of VL3A and VL3B or VL4A and VL4B, respectively, stopping the flow of blood sample. See Figure 2.5-6. The time needed to move the sample through the reservoir varies, depending on the viscosity of the specimen.

Figure 2.5-6 Advancing the Sample Through RES1



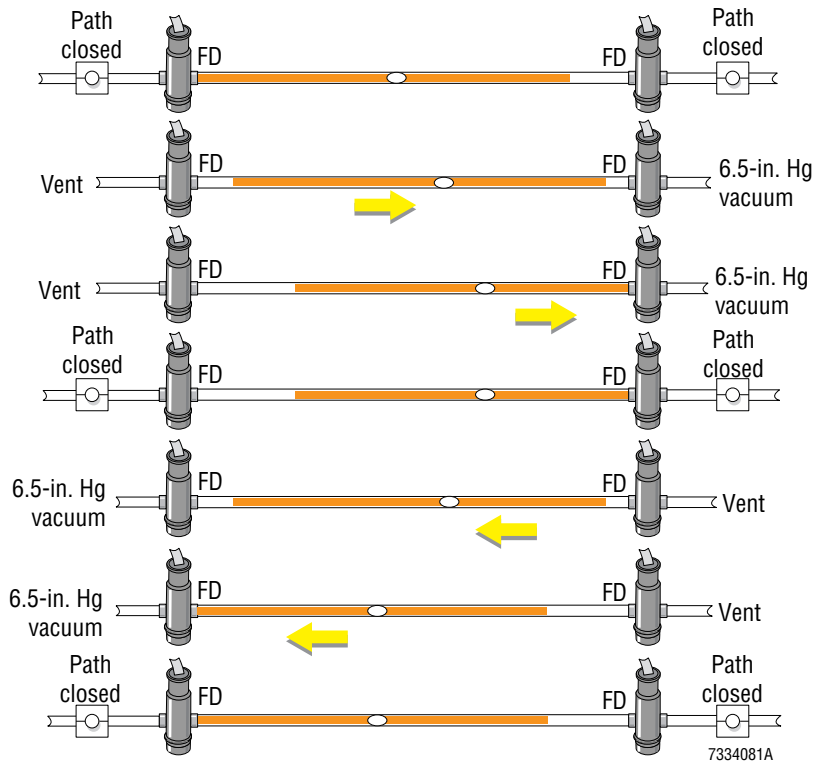
Holding and Mixing the Blood Sample

The capacity of the reservoir is larger than the volume of blood drawn into it. To mix the blood, the SlideMaker uses a pressure differential of atmospheric pressure and 6.5 in. Hg to move the blood back and forth in the reservoir, and fluid detectors, one on each end of the reservoir, to detect the leading or trailing edge of the blood to control sample position.

To move the blood sample from left to right in RES1, VL3B routes atmospheric pressure to the left side of RES1 and VL3A routes 6.5 in. Hg to the right side to pull the blood sample to the right. When the blood reaches FD2, VL3A and VL3B are closed, stopping movement to the right. To move the blood sample from right to left in RES1, VL3A routes atmospheric pressure to the right side of RES1 and VL3B routes 6.5 in. Hg to the left side to pull the blood sample to the left. When the blood reaches FD3, VL3A and VL3B are closed, stopping movement to the left. See Figure 2.5-7.

Similarly, to move the blood sample from left to right in RES2, VL4B routes atmospheric pressure to the left side of RES2 and VL4A routes 6.5 in. Hg to the right side to pull the blood sample to the right. When the blood reaches FD4, VL4A and VL4B are closed, stopping movement to the right. To move the blood sample from right to left in RES2, VL4A routes atmospheric pressure to the right side of RES2 and VL4B routes 6.5 in. Hg to the left side to pull the blood sample to the left. When the blood reaches FD5, VL4A and VL4B are closed, stopping movement to the left.

Figure 2.5-7 Mixing the Blood Sample



VL16 and VL17 route the atmospheric pressure and 6.5 in. Hg, respectively, to the right side of the sample; VL15 and VL14 route the atmospheric pressure and 6.5 in. Hg, respectively, to the left side of the sample.

The duration of the mixing cycle depends on the duration of the Analytical Station's "count" cycle, but at a minimum it is 2.2 seconds and at a maximum it is 15.0 seconds.

Note: Only samples analyzed in the CBC ONLY or CBC/DIFF test modes are held and mixed in the reservoir. Samples analyzed in the CBC/RETIC or CBC/DIFF/RETIC test modes are simply pulled through the reservoir and processed.

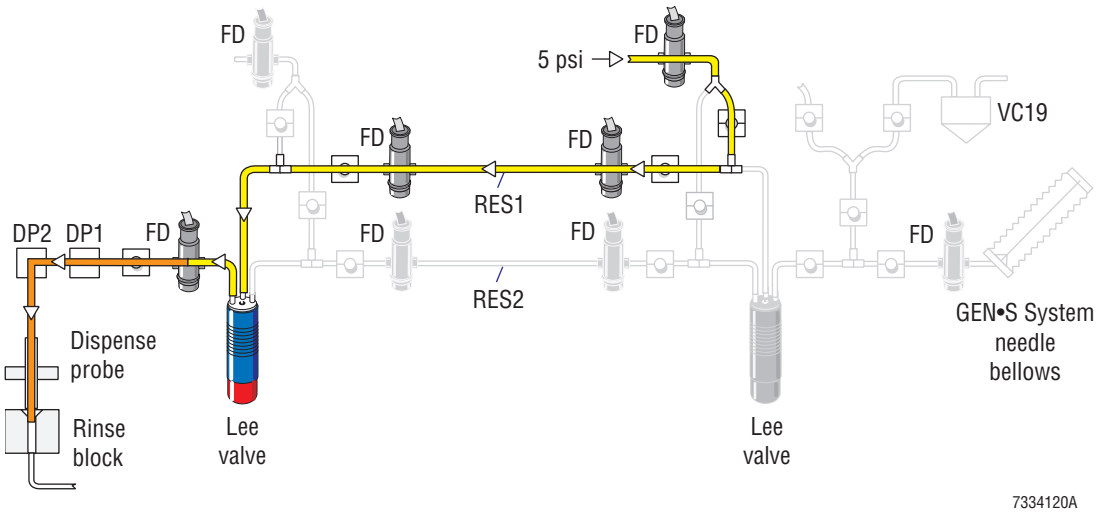
After completion of the mixing cycle, the reservoir lines are left pinched to hold the blood sample in the reservoir while the other reservoir is rinsed and dried. For details, see Rinsing and Drying the Aspiration and Dispense Lines. The blood sample is held in the reservoir for a minimum of 17 seconds and a maximum of 21.0 seconds, depending on conditions in the Analytical Station. The duration of this cycle could be extended if the Analytical Station performs two bar code reads.

Transferring the Blood Sample to the Dispense Probe and Priming the Dispense Line

Before transferring the blood sample to the dispense probe, the SlideMaker ensures the dispense probe is down in the rinse block, and then uses 30 psi to dry the dispense line and probe. The probe down sensor, SEN12, detects when the dispense probe is down. The fluid detectors FD6 and FD8 confirm the presence of air during the drying of the dispense lines.

To prime the dispense line, SOL24 opens the pathway for the correct reservoir; VL8 is activated, opening the line to the dispense probe; and the valves on either end of the reservoir, VL3A and VL3B for RES1, or VL4A and VL4B for RES2, are deactivated, opening the reservoir. Then 5 psi from VL18 is routed through VL3A for RES1 or VL4A for RES2, pushing the blood sample from the reservoir, through the dispense line, and then through the dispense probe until the leading edge, air bubble and front section of the trailing segment are pushed out the dispense probe and into the rinse block. See Figure 2.5-8.

Figure 2.5-8 Priming the Dispense Line with Sample



Fluid detector FD6 is used to detect the trailing edge, a “not blood condition" at the end of the blood sample. Upon detection of the trailing edge of the sample, VL8 closes to stop the flow of the sample.

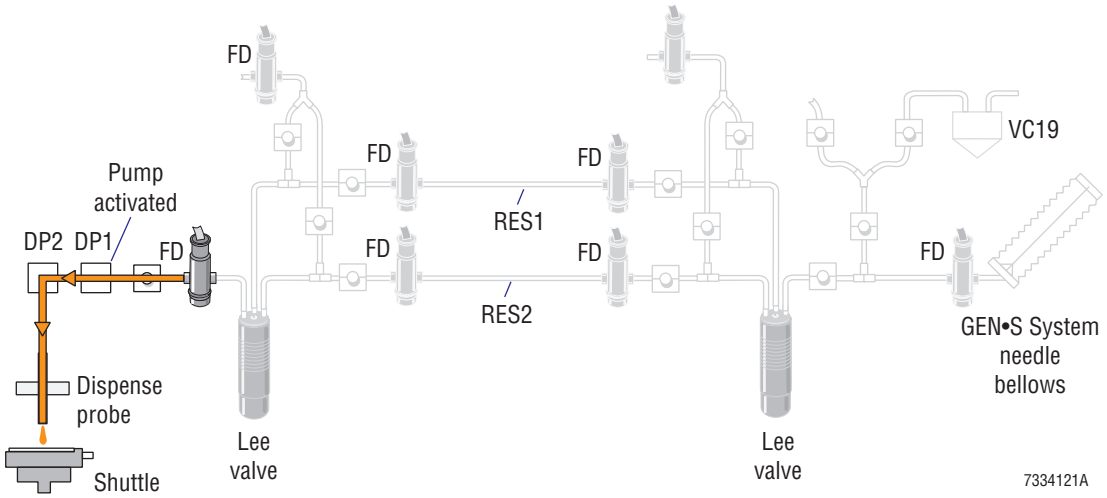
At the end of the process, the dispense line is fully primed with sample. In an overlap cycle mode, this process is synchronized to occur when the subsequent sample is advancing to the reservoir.

Dispensing a Drop of Blood Sample onto the Slide

After the dispense line is primed, CL10 moves the dispense probe up until the probe up sensor, SEN11, senses that the dispense probe is up, out of the rinse block. SOL42 operates CL10 to move the dispense probe up and down.

After the dispense probe is up, the SlideMaker moves the shuttle with a labeled slide from the Label Printer module to the dispense position. When the dispense position sensor, SEN7, senses the presence of the shuttle, CL10 moves the dispense probe down until the dispense probe is about 0.040 in. above the slide. Then SOL9 is energized, activating the dispense pump, DP1, which displaces a nominal 4.0 µL blood drop onto the slide. See Figure 2.5-9.

Figure 2.5-9 Dispensing a Blood Drop onto the Slide



After the drop is dispensed, CL10 moves the dispense probe back to its up position. When the probe up sensor, SEN11, senses the dispense probe in the up position, the shuttle moves the labeled slide with the blood drop to the smear position for smearing.

In overlap cycle single-slide mode, the dispensing of the drop of blood occurs simultaneously with the backwashing and drying of the aspiration lines of the subsequent sample.

Rinsing and Drying the Aspiration and Dispense Lines

While the sample is in the reservoir, the sample aspiration lines are rinsed in preparation for aspirating the next sample. The backwashing and drying of the aspiration lines consists of three processes:

- The SlideMaker and the Analytical Station's synchronized rinsing of the SlideMaker's aspiration line to the needle vent chamber, VC19 and the needle bellows. See Figure 2.5-10.
- The SlideMaker's pressurized air drying of its aspirate line to the vent chamber, VC19. See Figure 2.5-11.
- The Analytical Station's vacuum drying of the needle vent line to VC19. See Figure 2.5-12

Fluid detectors, FD6 and FD8 are used to detect and confirm the presence of air in the dispense lines prior to aspiration of the next sample.

Blood detector BD3 is used to confirm the correct rinsing and drying of the needle-vent line.

Figure 2.5-10 Analytical Station/SlideMaker Synchronized Rinse

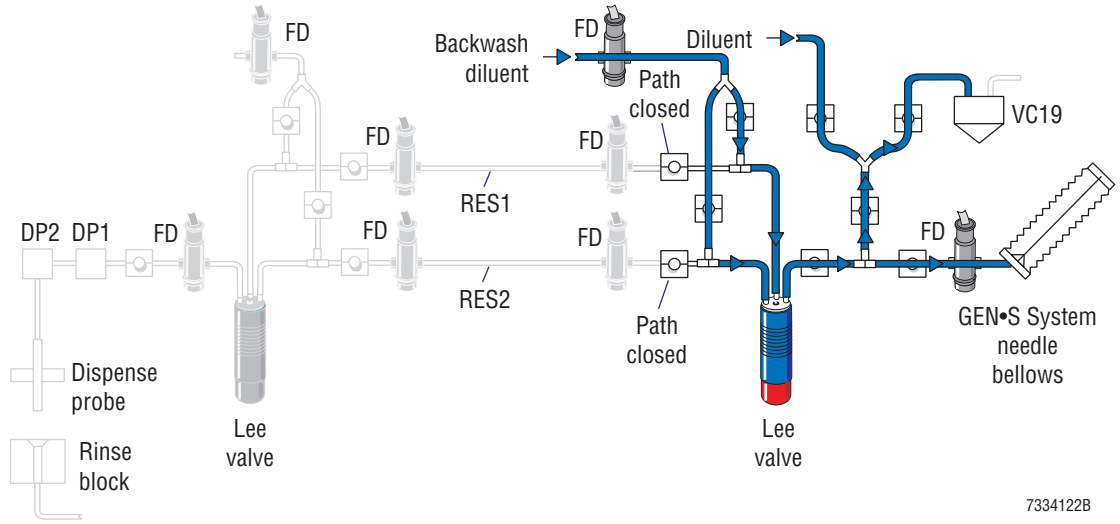


Figure 2.5-11 Drying the Lines to the Vent Chamber

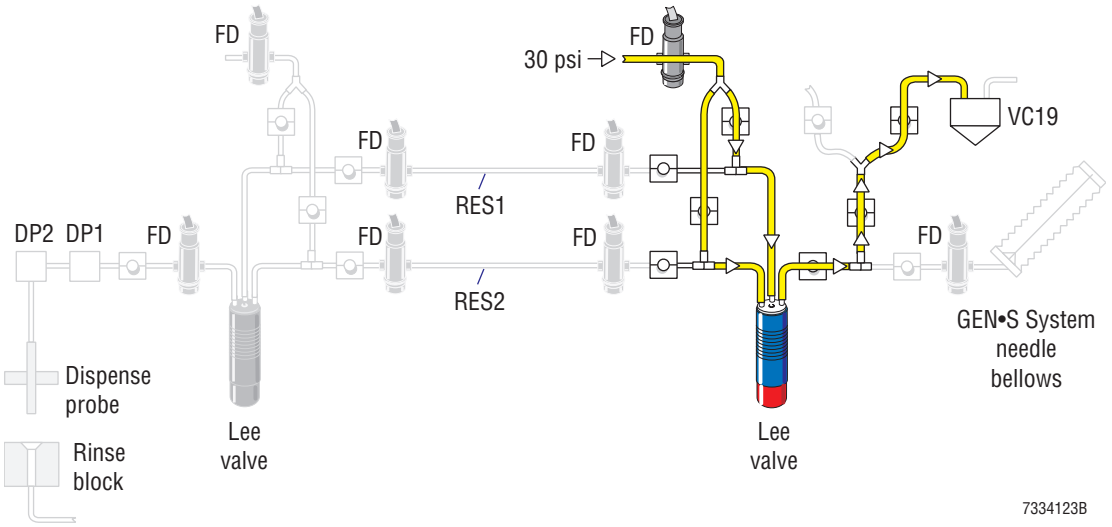
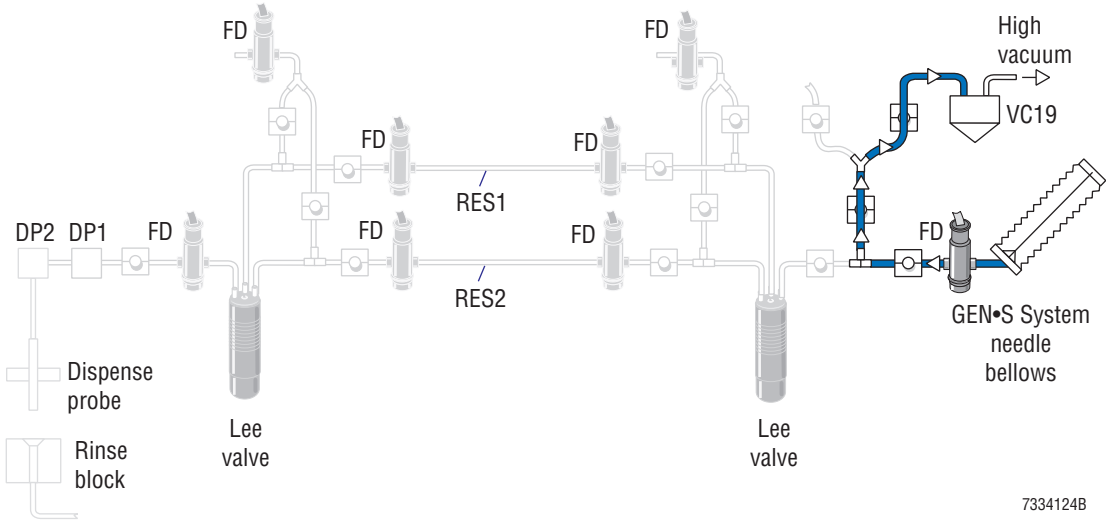


Figure 2.5-12 Drying the Needle Vent Lines



After the drop of blood is dispensed, the SlideMaker backwashes the reservoir and the dispense line. Backwashing and drying the reservoir and dispense lines consists of five processes:

- Diluent rinsing of the appropriate sample reservoir and dispense lines. See Figure 2.5-13.
- 30 psi drying of the reservoir and dispense line through the dispense probe and rinse block to waste. See Figure 2.5-14.
- Refilling the reagent tank, TK1.
- Draining the vent chamber, VC4, and the RVac chamber, VC3, into the waste chamber, VC2.
- Draining the waste chamber, VC2, to the Analytical Station's waste container.

Figure 2.5-13 Backwashing the Sample Reservoir and Dispense Line

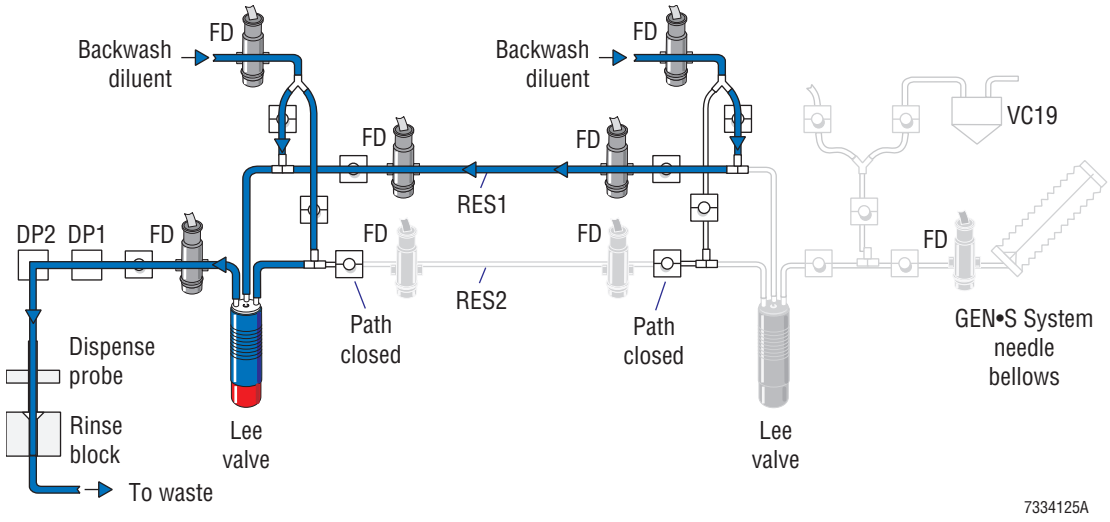
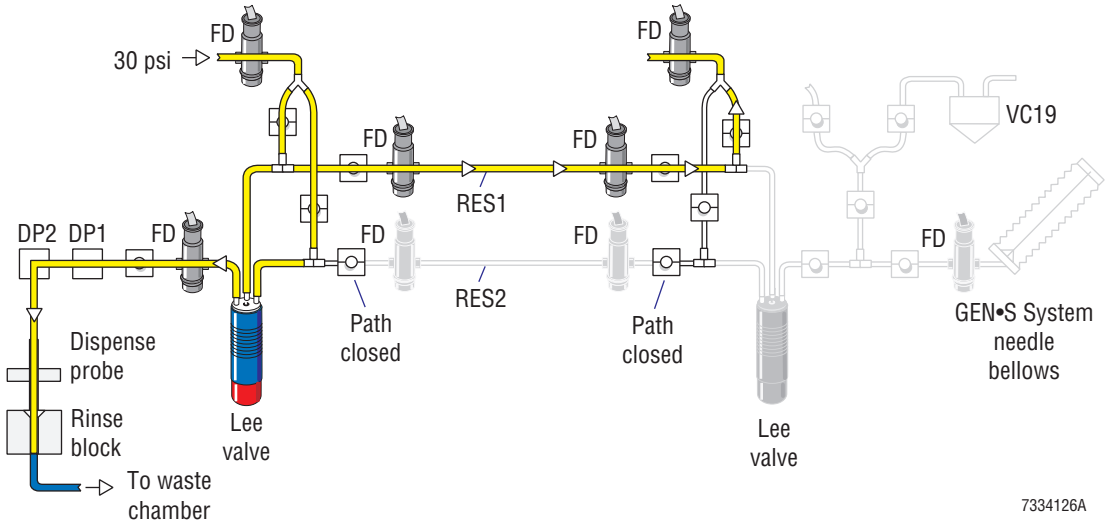


Figure 2.5-14 Drying the Sample Reservoir and Dispense Lines



At the appropriate times during the rinsing and the drying of the reservoir and dispense lines, the fluid detectors FD2, FD3, FD6, FD7, and FD8 detect and confirm the presence of diluent and air.

At the appropriate times during the rinsing and the drying of the aspiration paths, the fluid detectors FD7, FD1, and BD3 detect and confirm the presence of diluent and air.

Sample Access and Reservoir Module

The Sample Access and Reservoir module is located in the lower compartment of the Diluter. Refer to Figure 2.1-1.

The Sample Access and Reservoir module provides the pathway for sample aspiration from the Analytical Station to the SlideMaker and, in conjunction with the Dispense module, controls the volume, separation and positioning of the blood sample, and the rinsing and drying of the sample transport lines.

The Sample Access and Reservoir module also provides the interfaces with the Analytical Station needed for the Analytical Station to backwash the SlideMaker's aspiration line when the SlideMaker is powered down or inoperable. These interfaces consist of the T-fitting tapped into the vent line of the needle, and the electrical connection to the four- station pneumatic manifold, MF6. The Diluter 3 card in the Analytical Station powers and drives the solenoids on MF6.

The functions of the Sample Access and Reservoir module components (Figure 2.5-1), excluding the pneumatic solenoids, pinch valves, and associated fittings and tubing, are:

- Fluid detectors FD1, FD2 and FD4 - Detect and identify the aspirated sample.
- Fluid detector FD7 - Detects diluent and air in the aspiration lines during backwashing.
- SOL118 - Controls the routing of the aspirated sample to the correct reservoir.
- RES1 and RES2 - Hold and then transfer the blood sample to the SlideMaker.

For a list of the functions of the solenoids and associated pinch valves, refer to Table A.3-1.

Dispense Module

The Dispense module is located on the right side of the SlideMaker. Refer to Figure 2.1-2.

The Dispense module provides the hardware for measuring the drop of blood used for a smear and, in conjunction with the Sample Access and Reservoir module, controls the volume, separation and positioning of the blood sample, and the rinsing and drying of the sample transport lines. The functions of the Dispense module components (Figure 2.5-2), excluding the pneumatic solenoids, pinch valves, and associated fittings and tubing, are:

- Fluid detectors FD3 and FD5 -
  - Control the position of the blood sample in RES1 or RES2, respectively.
  - Detect the presence of blood during mixing of the sample in RES1 or RES2, respectively, determining when to stop right to left movement.
- Fluid detector FD6 -
  - Detects the trailing edge of the blood during the dispensing of the prime sample and stops the flow.
  - Confirms the presence of air during drying of the dispense line.
- Fluid detector FD8 - Detects diluent and air during backwashing and drying of the dispense line and the reservoirs.

- Dispense pump, DP1 - Measures and dispenses the blood drop for the smear in the single-slide mode.
- Dispense pump, DP2 - Measures and dispenses the blood drop for the smear in the dual-slide mode. (Not currently in operation.)
- SOL24 - Controls routing of the sample from the correct reservoir to the dispense line.

For a list of the functions of the solenoids and associated pinch valves, refer to Table A.3-1.

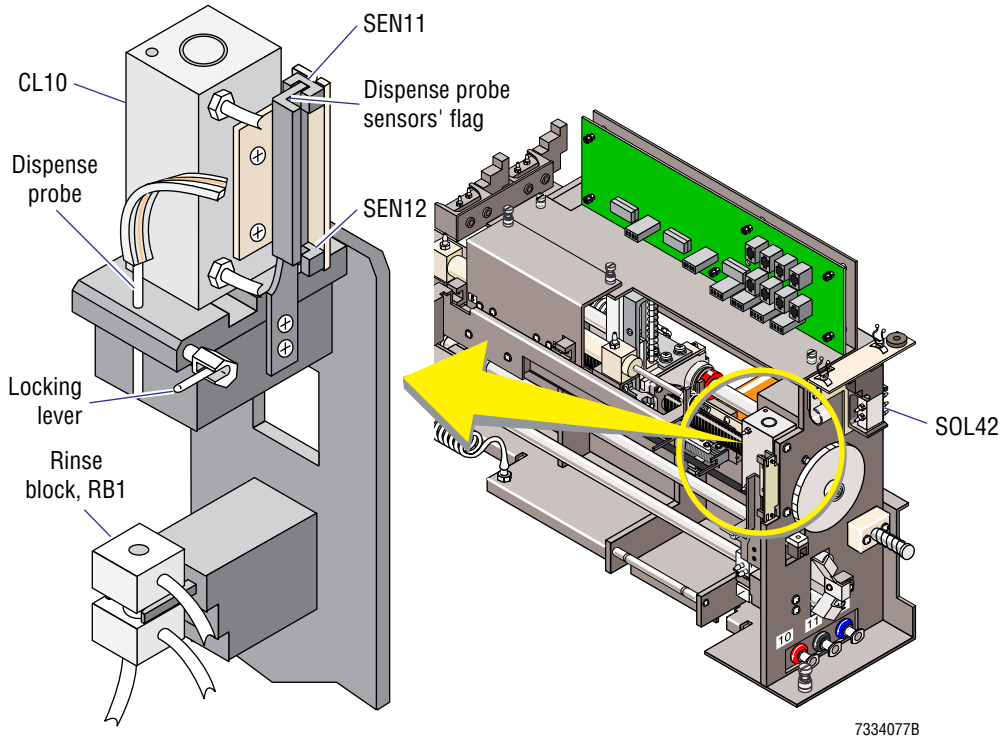
Dispense Pump

The SlideMaker uses a special pinch valve design, called a dispense pump, to control the volume of the drop of sample dispensed onto the slide. The dispense pump, designed for use with 0.023 in. ±0.002 in. i.d., I-beam tubing, has a controlled pinching length that displaces a nominal 4.0 µL sample when the valve is activated, pinching the tubing. The target volume is 4.0 µL ±0.5 µL. To compensate for the tolerance extremes of the internal diameter of the tubing and still meet the dispensed volume requirement, the dispense pump has four selectable pinching surfaces. Refer to Heading 4.7, DISPENSE PUMP ADJUSTMENT.

Dispense Probe Mechanism

While the dispense probe mechanism is functionally part of the Dispense module, it is physically part of the Slide and Smear module. See Figure 2.5-15.

Figure 2.5-15 Dispense Probe Mechanism and Rinse Block



The dispense probe mechanism consists of the dispense probe and its holder; the cylinder for operating the dispense probe, CL10; two sensors for sensing the position of the dispense probe, the probe up sensor, SEN11, and the probe down sensor, SEN12; and the dispense probe sensor flag.

The two sensors, in conjunction with the dispense probe sensors' flag, determine the position of the dispense probe in each of its three positions:

- Retracted. SOL42 is de-energized retracting CL10 which retracts the dispense probe.
- Extended into the rinse block. SOL42 is energized, extending CL10.
- Extended to the dispense position above the slide on the shuttle. SOL42 is energized, extending CL10. It works in conjunction with the dispense position sensor, SEN7.

Rinse Block

While the rinse block, RB1, is functionally part of the Dispense module, it is physically part of the Slide and Smear module. Refer to Figure 2.5-15.

During the SlideMaker cycle, the rinse cup:

- Collects the prime sample and backwash diluent from the dispense probe and routes it to the waste chamber, VC2.
- Provides vacuum for drying the outside of the dispense probe.

The rinse block is a floating design to allow for slight misalignment with the dispense probe. It comprises:

- A threaded hole into which the dispense probe engages.
- Two side ports, a diluent/cleaning agent port for the backwashing and a vacuum port for the vacuum drying of the dispense probe.
- One bottom port for the routing of waste from the dispense probe.

Dispense 1 Manifold and Dispense 2 Manifold Cards

The Dispense 1 Manifold and Dispense 2 Manifold cards are located in the Dispense module. Refer to Figure 2.5-2.

The Dispense 1 Manifold and Dispense 2 Manifold cards are an interface between the solenoids in the Dispense module and the Main Distribution card. The Main Fluidics Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from the System Control card.

The solenoids in the Dispense module are mounted directly on the Dispense 1 Manifold and Dispense 2 Manifold cards and are changed as an assembly.

Fluid Detectors

The fluid detectors for the SlideMaker are located in the Sample Access and Reservoir module (Figure 2.5-1) and the Dispense module (Figure 2.5-2).

The SlideMaker uses information from the fluid detectors, in conjunction with regulated vacuum or pressure, to determine the volume and positioning of the blood sample. The SlideMaker also uses fluid detectors to detect and confirm rinsing and drying of the blood sample lines.

The fluid detectors are designed to detect three distinct fluids: diluent, air and blood. The fluid detectors are calibrated with diluent. The output voltage ranges for the various fluids and the calibration tolerances are listed in Heading A.1, TOLERANCES AND LIMITS, under Fluid Detector Voltage Specifications.

To confirm the presence of a particular fluid, blood, air or diluent, several readings are taken at defined intervals.

With the exception of BD3, the fluid detectors are connected to the Smear/Transport Interface card which routes the signals from the fluid detectors, without modification, directly to the System Control card. BD3 is connected to the Diluter 2 card in the Diluter.

Function Summary

Table 2.5-1 summarizes the functions of the fluid detectors used by the SlideMaker, and lists the module location and the connector on the interface card for each fluid detector.

Table 2.5-1 SlideMaker Fluid Detectors

FD	Functions	Module	Interface Card	Connector
FD1	Identifies blood in the aspiration line during aspiration to ensure the minimum volume is acquired. Identifies diluent and air in the aspiration line during rinsing and drying of the aspiration lines.	Sample Access and Reservoir (outside module, near needle)	Smear/Transport Interface	J25
FD2	Identifies the leading edge of the aspirated sample for RES1, determining when to stop aspiration. Detects the presence of blood during mixing in RES1, determining when to stop the left-to-right movement. Confirms the presence of diluent and air during the rinsing and drying of RES1 and the aspiration lines.	Sample Access and Reservoir	Smear/Transport Interface	J26
FD3	Controls the positioning of blood in RES1. Detects the presence of blood during mixing in RES1, determining when to stop the right-to-left movement. Confirms the presence of diluent and air during the rinsing and drying of RES1 and the aspiration lines.	Dispense	Smear/Transport Interface	J27
FD4	Identifies the leading edge of the aspirated sample for RES2, determining when to stop aspiration. Detects the presence of blood during mixing in RES2, determining when to stop the left-to-right movement. Confirms the presence of diluent and air during the rinsing and drying of RES2 and the aspiration lines.	Sample Access and Reservoir	Smear/Transport Interface	J28
FD5	Controls the positioning of blood in RES2. Detects the presence of blood during mixing in RES2, determining when to stop the right-to-left movement. Confirms the presence of diluent and air during the rinsing and drying of RES2 and the aspiration lines.	Dispense	Smear/Transport Interface	J29

Table 2.5-1 SlideMaker Fluid Detectors *(Continued)*

FD	Functions	Module	Interface Card	Connector
FD6	Detects the trailing edge of the blood during the dispensing of the prime sample, determining when to stop dispensing sample. Confirms the presence of diluent and air during the rinsing and drying of the dispense line.	Dispense	Smear/Transport Interface	J30
FD7	Detects diluent and air during the backwashing and drying of the aspiration lines.	Sample Access and Reservoir	Smear/Transport Interface	J31
FD8	Detects diluent and air during the rinsing and drying of the reservoirs and the dispense line. Confirms the presence of air during the drying of the aspiration lines.	Dispense	Smear/Transport Interface	J32
BD3	Identifies diluent and air in the aspiration line during the rinsing and drying of the aspiration lines. **Note:** BD3 is installed in GEN•S Systems and LH 750 Systems with a SlideMaker. While FD1 only checks the aspiration line for diluent and air if the SlideMaker is on, BD3 checks this line whether the SlideMaker is on or off. Since the aspiration line for the SlideMaker is also the needle-vent line for the Analytical Station, it is important to verify that this line is cleaned and dried during GEN•S System or LH 750 System operation.	Sample Access and Reservoir (outside module, near needle)	Diluter 2	J9

Error Conditions

If fluid detectors FD1 through FD6 sense a problem while aspirating or dispensing the blood sample, the SlideMaker discards the sample and warns the operator. If the same problem occurs three times in a row, the SlideMaker generates an error message and stops.

If fluid detectors FD1 through FD8 sense a problem while rinsing or drying the lines, the SlideMaker generates an error message and stops.

If blood detector BD3 senses a problem while rinsing or drying the needle-vent line, the GEN•S System or the LH 750 System generates a VLS error and disables the Automatic mode. For more details about the VLS (vent-line sensing) function, see Heading B.1, VLS FUNCTION, CALIBRATION, AND TROUBLESHOOTING.

If an error message occurs for any of the fluid detectors, FD1 through FD8, refer to Table 7.2-8, Fluidics Error Messages. If a VLS error occurs, refer to the error message tables in Chapter 7 of the Analytical Stations Service Manual.

Sensor Summary

In addition to the eight fluid detectors and the blood detector discussed in this section (Fluid Detectors), the sample acquisition system uses the three sensors listed in Table 2.5-2 to monitor its activities. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.5-2 Sample Acquisition System Sensors

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
7	Dispense position See Figure 2.7-1	Infrared interrupting Blocked = Shuttle at dispense position	Smear/Transport Interface	J16	J6, 13
11	Probe up See Figure 2.5-15	Infrared interrupting Blocked = probe up	Smear/Transport Interface	J20	J6, 17
12	Probe down See Figure 2.5-15	Infrared interrupting Blocked = probe down	Smear/Transport Interface	J21	J6, 18

2.6 SMEAR PROCESSING SYSTEM: CASSETTE TRANSPORT MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Cassette Transport module. The Cassette Transport module:

1. Moves filled slide cassettes into position for retrieval of the slides.
2. Retrieves the slides from the slide cassettes.
3. Moves the empty slide cassettes into position for retrieval by the operator.

This section also describes the Slide Ejector Interface card.

For more information on the smear processing system, see the Slide and Smear module (Heading 2.7), the Label Printer module (Heading 2.8), the Dryer module (Heading 2.9), the Slide Elevator module (Heading 2.10), and the Basket Queue module (Heading 2.11).

Description

The Cassette Transport module comprises three modules and an assembly:

- Cassette Input Queue module
- Slide Ejector module
- Upper cassette transfer mechanism
- Cassette Output Queue module

The components that comprise the Cassette Transport module are located to the left and on top of the Dryer module. Refer to Figure 2.1-2.

Preparing the Slide Cassettes for Processing

The operator:

- Opens the slide cassette cover and inserts up to 100 microscopic slides into the slide cassette.
- Slides the cover to the closed position.
- Ensures the bottom slide is correctly located inside the slide cassette.
- Places the slide cassettes, up to a maximum of four, in the Cassette Input Queue module.

Cassette Input Queue Module

The Cassette Input Queue module automatically advances the filled slide cassettes to the slide ejection station as needed. Refer to Figures 2.6-1 and 2.6-2 or Figures 2.6-3 and 2.6-4 to locate the components in the Cassette Input Queue module. (Figures 2.6-1 and 2.6-2 show the old configuration of the Slide Ejector module, Figures 2.6-3 and 2.6-4 show the new configuration. The Cassette Input Queue module has not changed.)

When a slide cassette is needed in the slide ejection station, SOL50 is energized, extending CL6. CL6 operates the input cassette transfer mechanism, which pushes the slide cassettes to the slide ejection station.

Figure 2.6-1 Cassette Input Queue and Slide Ejector Modules' Components, Old Configuration, Front View

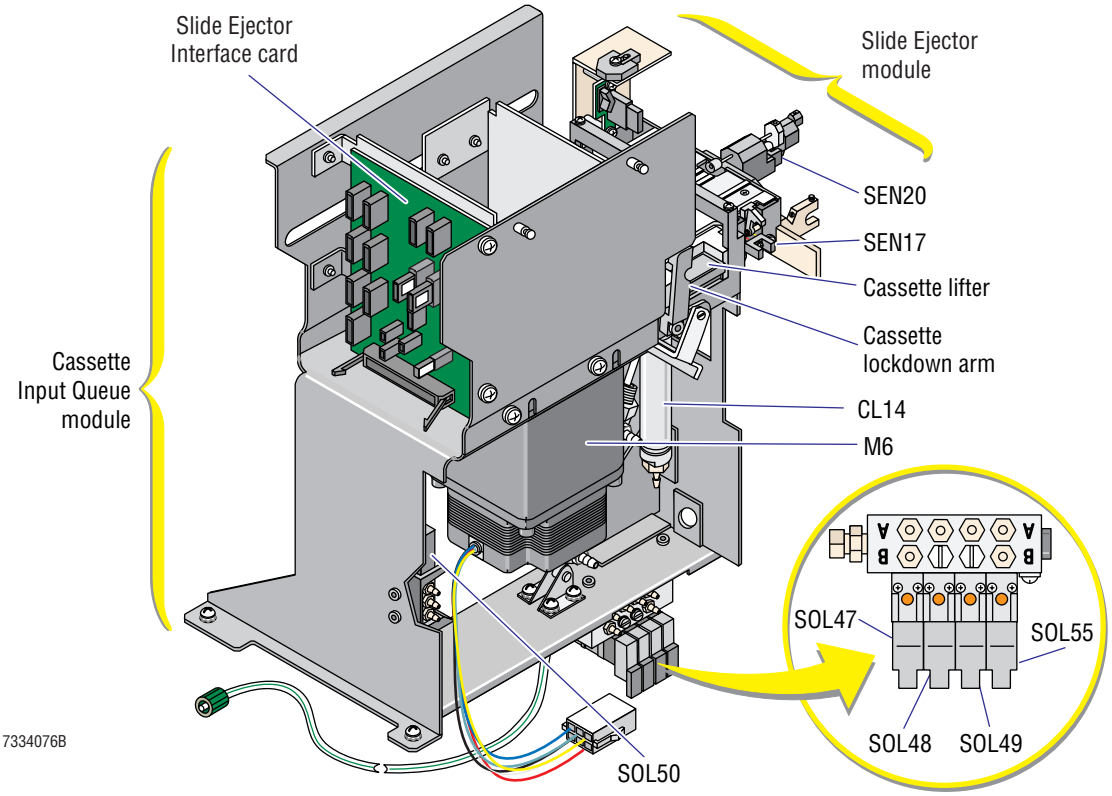


Figure 2.6-2 Cassette Input Queue and Slide Ejector Modules' Components, Old Configuration, Rear View

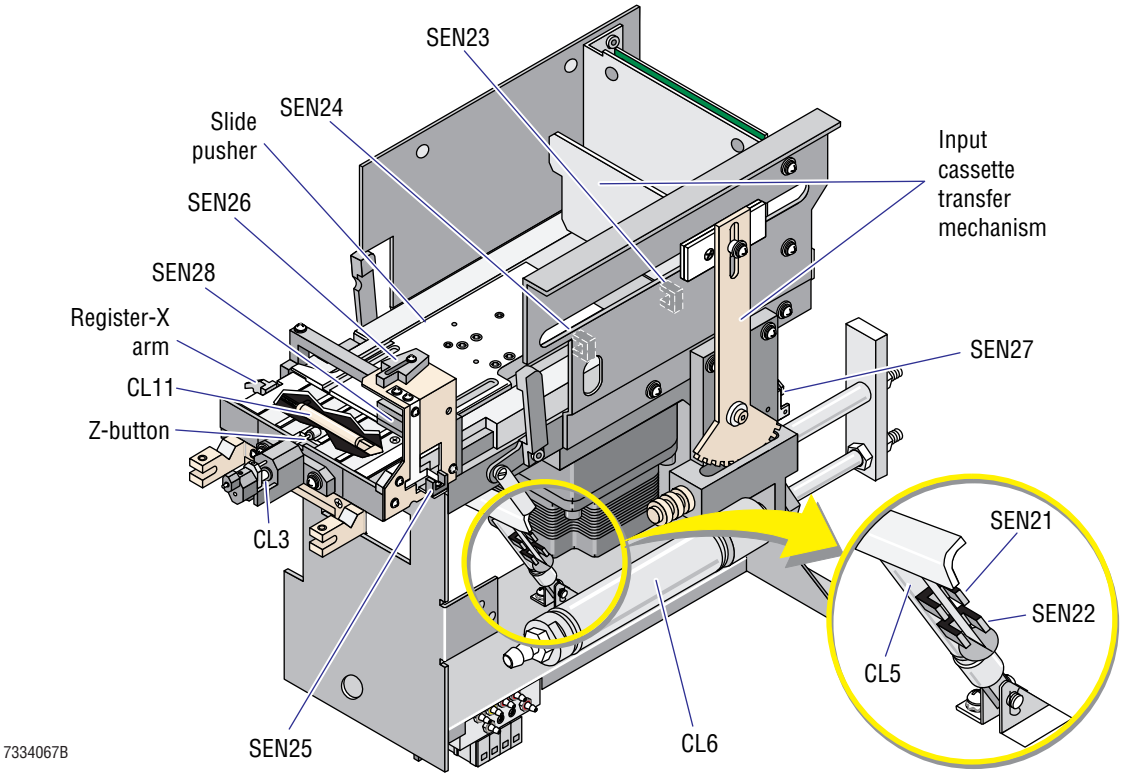


Figure 2.6-3 Cassette Input Queue and Slide Ejector Modules' Components, New Configuration, Front View

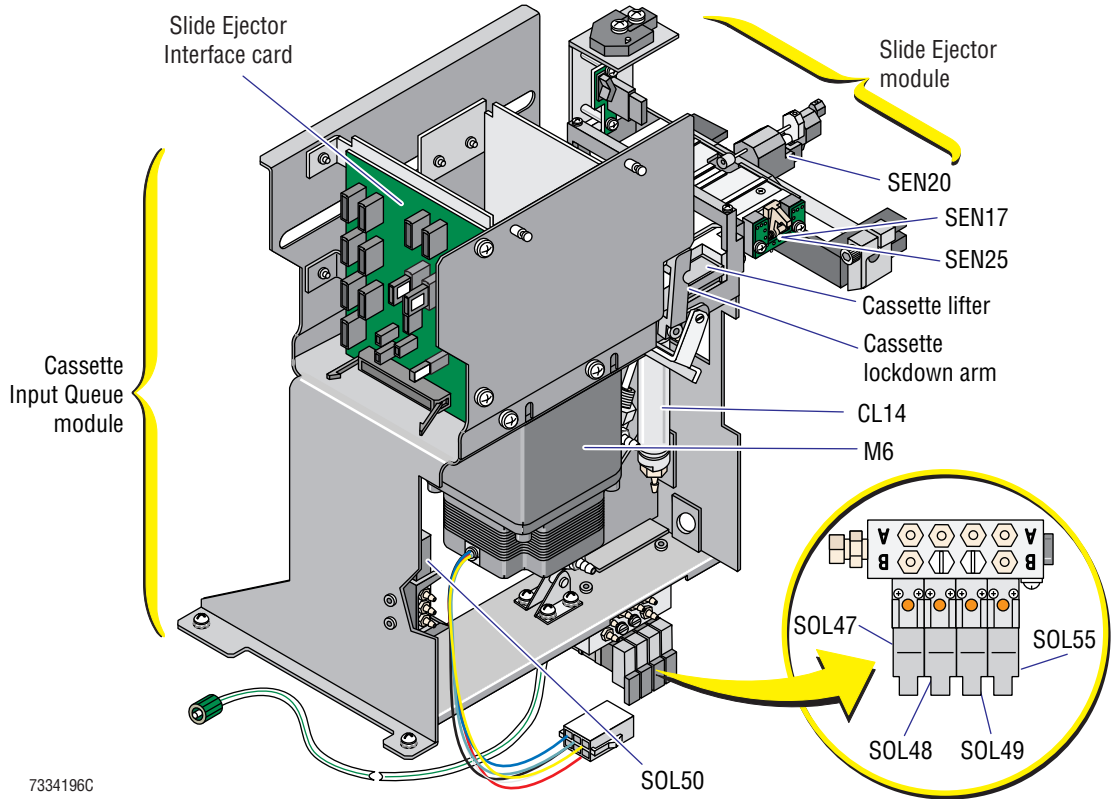
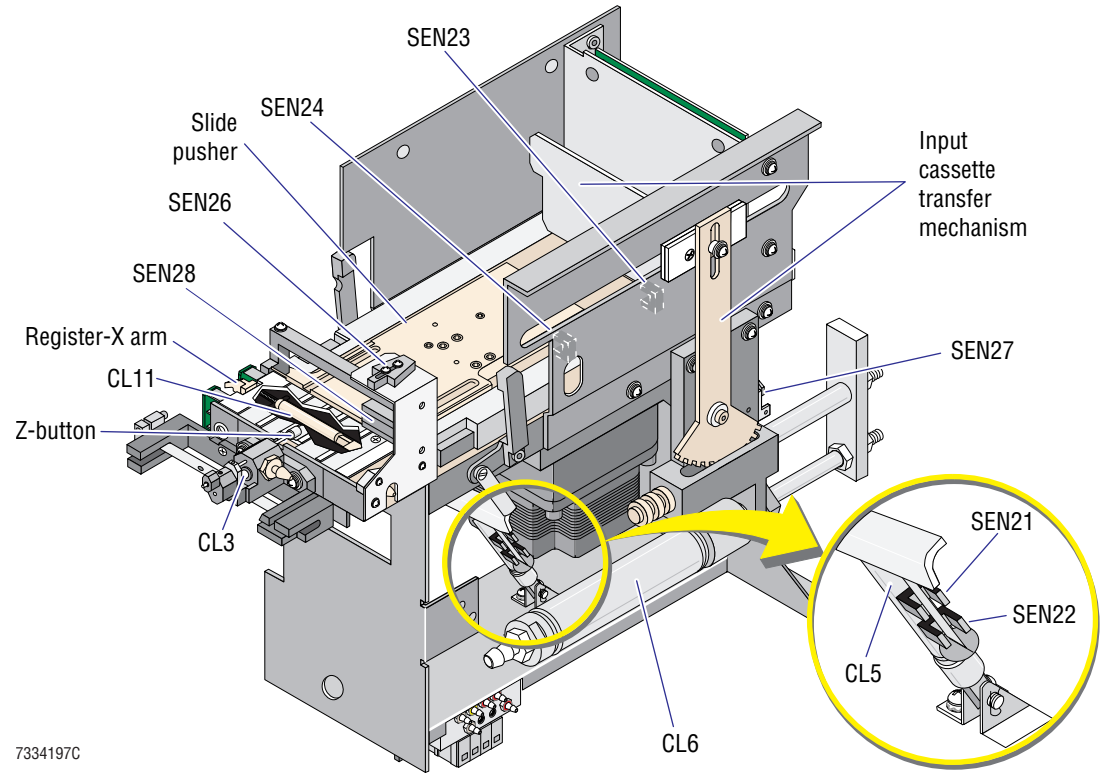


Figure 2.6-4 Cassette Input Queue and Slide Ejector Modules' Components, New Configuration, Rear View



When the cassette present sensor, SEN26, senses a slide cassette is present at the slide ejection station:

1. SOL50 is de-energized, and CL6 retracts, returning the input cassette transfer mechanism to its home position. The input cassette retracted sensor, SEN27, senses when the input cassette transfer mechanism is at home (CL6 is fully retracted).
2. SOL55 is energized, retracting the cassette lifter cylinder, CL14, which lowers the slide cassette. After the slide cassette is lowered, SOL 47 is energized to extend CL5. CL5 operates two lockdown arms that lock the front of the slide cassette in position for slide ejection. The cassette locked sensor, SEN21, senses when the slide cassette is locked down.

Slide Ejector Module

The Slide Ejector module removes the slides from the slide cassette for processing. Refer to Figures 2.6-1 and 2.6-2 (old configuration) or Figures 2.6-3 and 2.6-4 (new configuration) to locate the components in the Slide Ejector module.

When the slide cassette is locked into position for ejecting a slide, if the slide pickup bridge is empty:

1. The slide pusher stepper motor, M6, retracts the slide pusher. As the slide pusher retracts from under the slide cassette, the bottom slide in the cassette drops into position for ejection. When the slide pusher retracted sensor, SEN23, senses the slide pusher is fully retracted, the slide pusher mechanism stops.
2. SOL49 is energized, extending the register-X cylinder, CL11. CL11 pushes the register-X arm down to make room for the next slide. The register-X (cleared) sensor, SEN17, senses when the register-X arm is down, out of the way.
3. M6 extends the slide pusher, pushing the bottom slide in the slide cassette forward, onto the slide pickup bridge. When the slide pusher extended sensor, SEN24, senses the slide pusher is fully extended, the slide pusher mechanism stops.

   Note: A slide on the slide pickup bridge deactivates the register-Z forward sensor, SEN20. If SEN20 is not deactivated, the Slide Ejector module retries ejecting a slide.
4. SOL48 is energized, extending the Z-button cylinder, CL3. CL3 retracts the Z-button, releasing the force applied by the button on the slide.
5. SOL49 is de-energized, releasing the pressure on CL11. The spring mechanism in the register-X arm pushes the arm up onto the right edge of the slide and pushes the slide against the left wall of the slide pickup bridge, registering the slide on the X-axis. The slide registered sensor, SEN25, senses when the slide is registered against the left wall.

   Note: Proper registration of the slide is critical, as the position of the slide affects the ability of the smear truck to pick up the slide and move it into position for making a smear.
6. SOL48 is de-energized, releasing pressure on CL3. The spring in CL3 retracts the cylinder rod, extending the Z-button. The Z-button pushes the slide firmly against the front edge of the slide pusher, registering the slide on the Z-axis.
7. SOL49 is energized, extending CL11. CL11 pushes the register-X arm down, making room for the smear truck to pick up the slide. The register-X (cleared) sensor, SEN17, senses when the register-X arm is down, out of the smear truck's path.

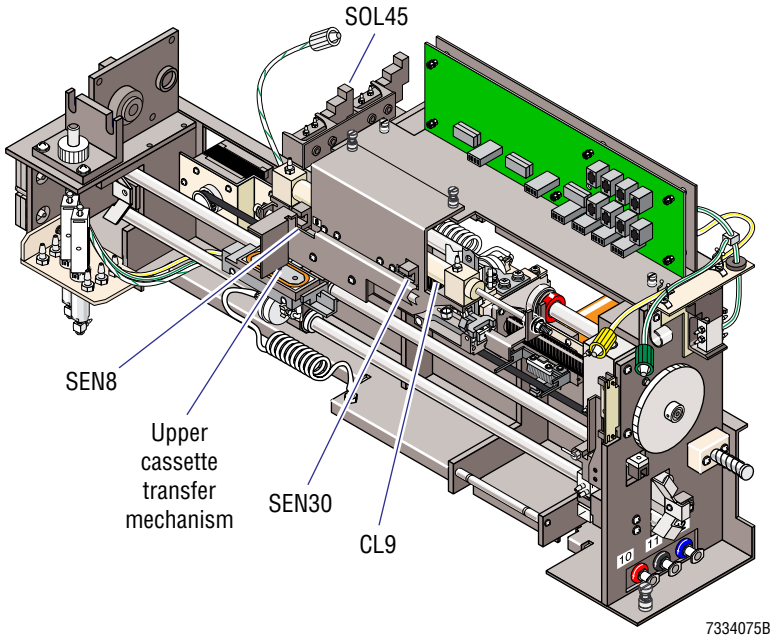
8. The smear truck moves to the slide pickup bridge and applies vacuum to the slide.
9. SOL48 is energized to retract the Z-button, removing the pressure applied by the Z-button on the slide.
10. The smear truck picks up the slide. Removing the slide from the slide pickup bridge deactivates the slide registered sensor, SEN25.
11. SOL48 is de-energized, releasing pressure on CL3. Since the slide pickup bridge is empty, CL3 extends the Z-button all the way to the slide pickup bridge, activating the register-Z forward sensor, SEN20.
12. Deactivating SEN25 and activating SEN20 signals that the slide pickup bridge is empty. The process begins again.

The Slide Ejector module continues to eject slides until the cassette empty sensor, SEN28, senses the slide cassette is empty. At that time two to four slides remain in the slide cassette, allowing the SlideMaker to make smears from any samples already in progress. Then SOL47 is de-energized, retracting CL5, which unlocks the slide cassette. After the cassette unlocked sensor, SEN22, senses the slide cassette is unlocked, SOL55 is de-energized extending, CL14. CL14 lifts the empty slide cassette into position for transfer to the Cassette Output Queue module.

Upper Cassette Transfer Mechanism

The upper cassette transfer mechanism moves the empty slide cassettes from the Cassette Input Queue module to the Cassette Output Queue module. While the upper cassette transfer mechanism is functionally part of the Cassette Transport module, it is physically part of the Slide and Smear module. Refer to Figure 2.6-5.

Figure 2.6-5 Upper Cassette Transfer Mechanism Components



Before the upper cassette transfer assembly moves a slide cassette, the output cassette transfer mechanism is moved to the rear of the Cassette Output Queue module, positioning the output transfer cassette mechanism behind the incoming slide cassette (see Cassette Output Queue Module).

After the Cassette Output Queue module is prepared to accept the slide cassette, SOL45 is energized, extending CL9. CL9 operates the upper cassette transfer mechanism, which pushes the slide cassette from the Cassette Input Queue module to the Cassette Output Queue module. The cassette transit sensor, SEN30, senses when the slide cassette reaches the Cassette Output Queue module (CL9 is fully extended).

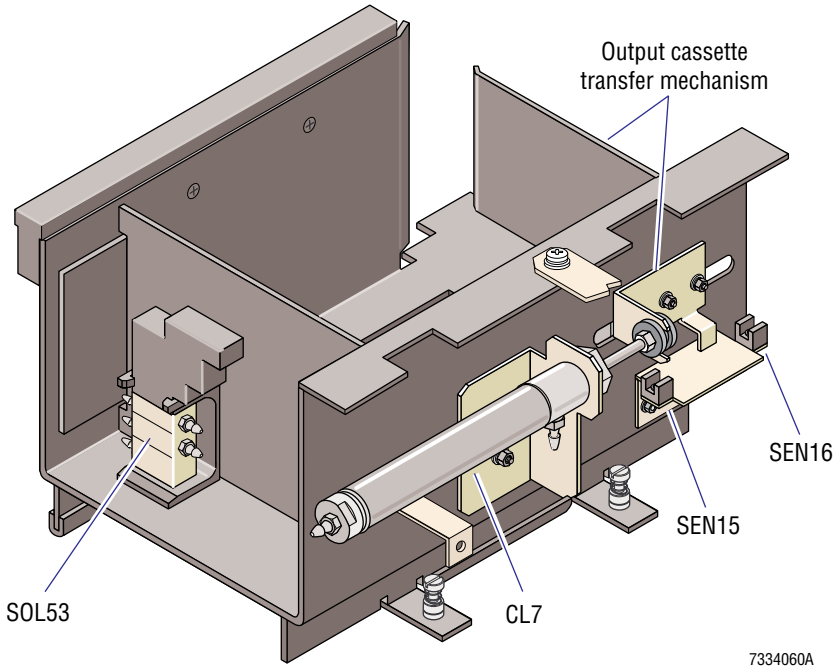
Once the slide cassette is at the Cassette Output Queue module, SOL45 is de-energized, retracting CL9. Retracting CL9 moves the upper cassette transfer mechanism back to its home position at the slide ejection station. The cassette transfer home sensor, SEN8, senses when the upper cassette transfer mechanism is at the home position (CL9 is fully retracted).

Cassette Output Queue Module

The Cassette Output Queue module advances the emptied or rejected slide cassettes to the front of the Cassette Output Queue module for storage until retrieved by the operator. The Cassette Output Queue holds up to four slide cassettes. Refer to Figure 2.6-6 to locate the components in the Cassette Output Queue module.

Before the upper cassette transfer mechanism moves a slide cassette from the Cassette Input Queue module to the Cassette Output Queue module, SOL53 is energized, extending CL7. CL7 operates the output cassette transfer mechanism. When CL7 is extended, it moves the output cassette transfer mechanism to the rear of the Cassette Output Queue module in preparation for receipt of a slide cassette. The output cassette extended sensor, SEN16, senses when the output cassette transfer mechanism is at the rear of the module.

Figure 2.6-6 Cassette Output Queue Module Components



SOL53 remains energized until the cassette transfer assembly moves the slide cassette into the Cassette Output Queue module (see Cassette Output Queue Module).

After the slide cassette reaches the Cassette Output Queue module, SOL53 is de-energized, retracting CL7. As CL7 retracts it moves the output cassette transfer mechanism arm, pulling the slide cassette toward the front of the Cassette Output Queue module. The output cassette retracted sensor, SEN15, senses when the output cassette transfer mechanism is back in its home position.

Slide Ejector Interface Card

Function

The Slide Ejector Interface card is located on the front of the Cassette Input Queue module. Refer to Figure 2.6-2.

The Slide Ejector Interface card is an interface between the electrical components in the Cassette Transport module and the Main Distribution card. The Slide Ejector Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from the System Control card.
- Data signals to the System Control card

Connectors and Test Points

The locations of the connectors and test points on the Slide Ejector Interface card are shown in Figure A.2-4 and described in Tables A.2-11 and A.2-12, respectively.

Sensors Summary

The sensors used by the Cassette Transport module are listed in Table 2.6-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.6-1 Cassette Transport Assembly Sensors

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
8	Cassette transfer home See Figure 2.6-5	Infrared interrupting Blocked = Upper cassette mechanism at home position	Smear/Transport Interface	J17	J6, 14
15	Output cassette retracted See Figure 2.6-6	Infrared interrupting Blocked = output cassette transfer mechanism retracted (in home or rest position)	Slide Ejector Interface	J1	J9, 5
16	Output cassette extended See Figure 2.6-6	Infrared interrupting Blocked = output cassette transfer mechanism extended	Slide Ejector Interface	J2	J9, 6

Table 2.6-1 Cassette Transport Assembly Sensors *(Continued)*

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
17	Register X (cleared) See Figure 2.6-1 or Figure 2.6-3	Infrared interrupting Blocked = register X arm fully cleared the truck path	Slide Ejector Interface	J20	J9, 17
20	Register Z forward See Figure 2.6-1 or Figure 2.6-3	Infrared interrupting Blocked = register Z arm is fully forward (no slide is available for pickup)	Slide Ejector Interface	J21	J9, 4
21	Cassette locked See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = cassette locked	Slide Ejector Interface	J3	J9, 7
22	Cassette unlocked See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = cassette unlocked	Slide Ejector Interface	J4	J9, 8
23	Slide pusher retracted See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = slide ejector retracted	Slide Ejector Interface	J5	J9, 9
24	Slide pusher extended See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = slide ejector extended	Slide Ejector Interface	J6	J9, 10
25	Slide registered See Figure 2.6-2 or Figure 2.6-3	Infrared interrupting Blocked = left side of slide registered correctly	Slide Ejector Interface	J7	J9, 11
26	Cassette present See Figure 2.6-2 or Figure 2.6-4	Reflective infrared Reflection = cassette present in ejection position	Slide Ejector Interface	J8	J9, 12
27	Input cassette retracted See Figure 2.6-2 or Figure 2.6-4	Reflective infrared Reflection = input cassette transfer mechanism in home position	Slide Ejector Interface	J10	J9, 13
28	Cassette Empty Sensor card See Figure 2.6-2 or Figure 2.6-4	Reflective infrared (mounted on PCB) Reflection = cassette present and empty	Slide Ejector Interface	J11	J9, 14
30	Cassette transit See Figure 2.6-5	Infrared interrupting Blocked = upper cassette mechanism in transit between home and fully extended	Smear/Transport Interface	J23	J6, 5

2.7 SMEAR PROCESSING SYSTEM: SLIDE AND SMEAR MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Slide and Smear module. The Slide and Smear module:

- Transports and precisely positions the slide at the various locations in the SlideMaker for preparing the slide.
- Makes a wedge blood smear on the slide.

This section also describes the Smear/Transport Interface Card.

For more information on the smear processing system, see the Cassette Transport module (Heading 2.6), the Label Printer module (Heading 2.8), the Dryer module (Heading 2.9), the Slide Elevator module (Heading 2.10), and the Basket Queue module (Heading 2.11).

Description

The Slide and Smear module comprises two modules:

- Slide Transport module
- Smear module

The Slide and Smear module spans the area from the Label Printer module to the Dispense module. See Figure 2.1-2.

Slide Transport Module

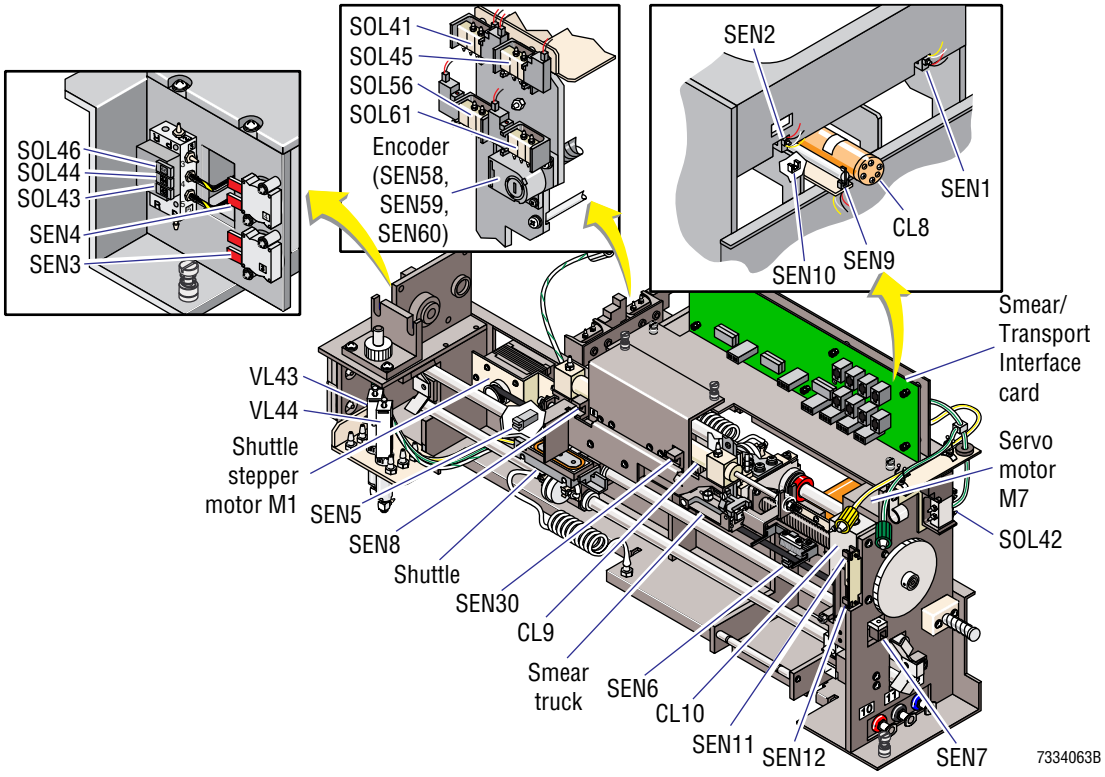
Function

The Slide Transport module uses a moving platform, called a shuttle, to transport a slide between three positions:

- The smear (home) position for access by the Smear module and the Dryer module
- The print (labeling) position for access by the Label Printer module
- The dispense position for access by the Dispense module.

The shuttle stepper motor, M1, and a pulley mechanism drive the shuttle along two guide bars. See Figure 2.7-1. Vacuum via VL44 is applied to the bottom of the shuttle to hold the slide in place during transport. The shuttle vacuum switch sensor, SEN4, monitors the vacuum to ensure a slide is present (no vacuum leak).

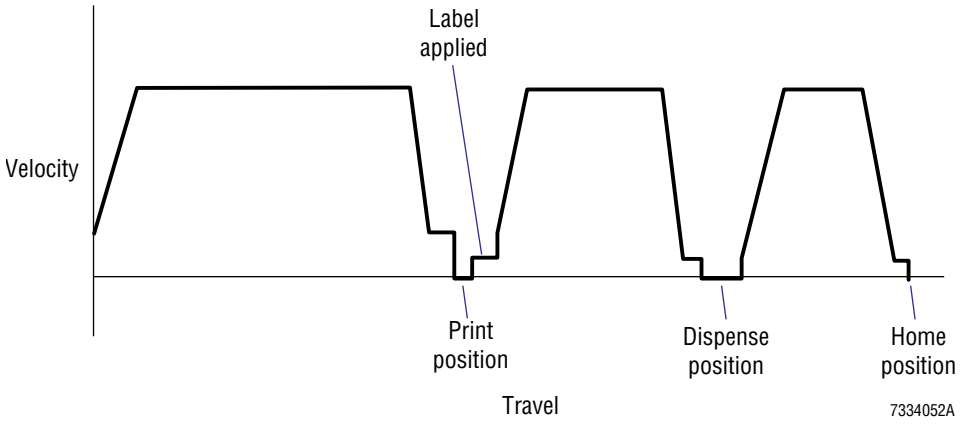
Figure 2.7-1 Slide and Smear Module Components



The SlideMaker software controls and varies the speed of the shuttle as needed to perform the necessary functions. See Figure 2.7-2. In general, however:

- As the shuttle moves toward a destination (position) it accelerates until it reaches a constant velocity.
- Before the shuttle reaches its destination it decelerates until it stops.

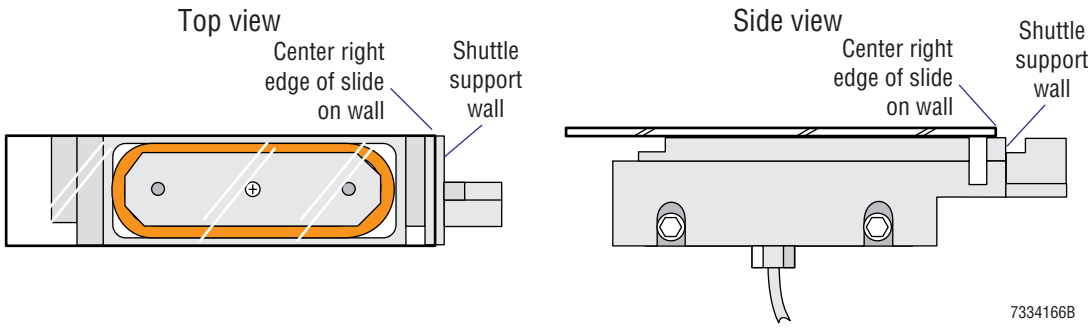
Figure 2.7-2 Shuttle Velocity Profile



At the beginning of the cycle, the shuttle is in the smear (home) position. Before moving the shuttle, the SlideMaker checks the shuttle for the presence of a slide. Normally the spreader slide used to make the previous smear is on the shuttle. If no slide is present, the smear truck in the Smear module moves to the Slide Ejector module, picks up a slide, and deposits the slide on the shuttle.

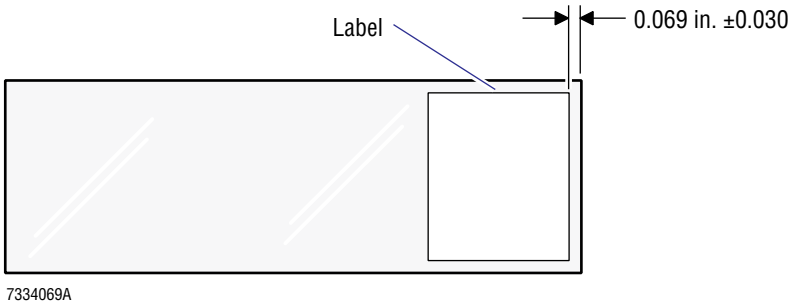
The smear truck is adjusted so that when it places the slide on the shuttle, the right side of the slide is centered on the shuttle support wall as shown in Figure 2.7-3.

Figure 2.7-3 Correct Position of the Slide on the Shuttle



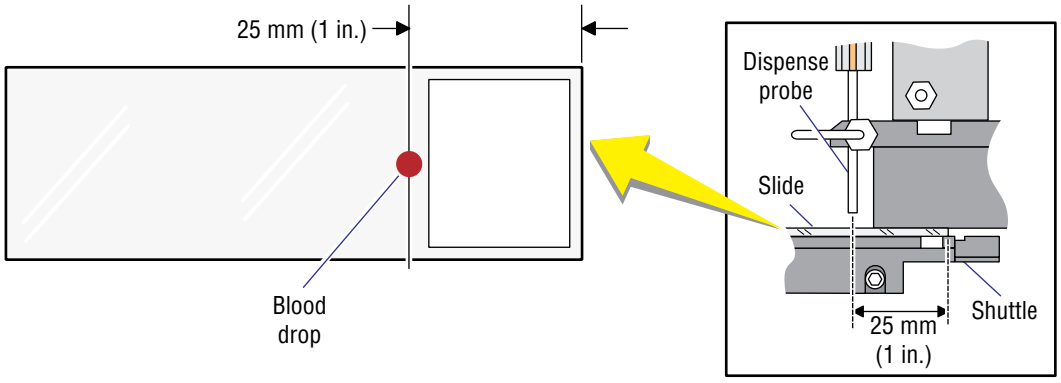
The shuttle moves the slide from the smear position to the print position at the Label Printer module. At the print position, the print position sensor, SEN5, senses the presence of the shuttle. The shuttle travels the additional steps set for the printer offset and stops. Then the shuttle reverses direction and starts moving at the same speed as the label dispenser in the Label Printer module, which applies a label to the slide using the “peel” technique. The **printer offset** is calibrated to ensure the label is positioned near the end of the slide, but not over the edge of the slide, as shown in Figure 2.7-4.

Figure 2.7-4 Correct Position of the Label from the End of the Slide



From the print position, the shuttle carries the slide to the dispense position. When the shuttle reaches the dispense position, the dispense position sensor, SEN7, senses the presence of the shuttle. The shuttle travels the additional steps set for the dispense offset and stops. The Dispense module dispenses a 4 µL drop of blood onto the slide. The **dispense offset** is calibrated to ensure the drop of blood is positioned in from the right edge of the slide as shown in Figure 2.7-5.

Figure 2.7-5 Correct Position of the Blood Drop on the Slide



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From the dispense position, the shuttle moves the slide back to the smear position for preparation of the smear by the Smear module. The smear position sensor, SEN6, senses the presence of the shuttle in the smear position. The shuttle travels the additional steps set for the home offset and stops. The **home offset** is calibrated to ensure that when the shuttle is in the smear position, it is aligned with the Smear module and the Dryer module.

Smear Module

Function

The Smear module uses a precisely controlled slide carrier, called a smear truck, to make the wedge blood smear and to place the spreader slide on the shuttle in preparation for the next smear. The smear truck is part of the servo system, which includes:

- The smear truck assembly
- The servo motor, M7, and gear train assembly
- A leadscrew guide assembly
- A quadrature encoder.

See Figure 2.7-1.

The servo motor drives the leadscrew guide assembly which converts rotation into the guided linear motion of the smear truck. The leadscrew drives the encoder which provides positional feedback from the encoder sensors, SEN58, SEN59 and SEN60, to the motor controller.

Two limit sensors, the servo forward sensor, SEN2, and the servo reverse limit sensor, SEN1, sense when the smear truck reaches a travel limit and brake the servo motor.

The SlideMaker software controls the direction, position, velocity and acceleration of the smear truck. The design features of the servo system allow very precise, accurate control of the smear truck's movement with quick response to changing conditions.

Two configurations of the smear truck assembly are currently in use. See Figures 2.7-6 and 2.7-7. Refer to these illustrations as you read the following description of operation.

The truck lift, which comprises a cylinder, CL12, a spring, and associated hardware, moves the smear truck vertically.

- When the smear truck is idle or is picking up a slide from the Slide Ejector module, the smear truck is raised and fully horizontal. In this state, SOL61 is de-energized, routing pressure to the bottom of the truck lift cylinder, CL12
- To pickup a slide, SOL61 is energized to release the pressure on the bottom of CL12, and SOL56 is energized to route pressure to the top of CL12. This action pushes the smear truck down and compresses the truck lift spring. When the smear truck contacts the slide, it pivots the smear truck into the fully horizontal position.
- To make a smear, the smear truck tilts down into the smearing position. To accomplish this position, SOL61 is energized, removing pressure from the bottom of CL12. Gravity tilts the smear truck down.
- After the smear is made, SOL61 is de-energized, routing pressure to the bottom of CL12 which pushes the smear truck back to the horizontal position.
- To lower the spreader slide onto the shuttle, SOL61 is energized to release the pressure on the bottom of CL12, then SOL56 is energized, routing pressure to the top of CL12. This action pushes the smear truck down and compresses the truck lift spring. When the slide contacts the shuttle, it pivots the smear truck up into the fully horizontal position.
- To raise the smear truck back to the raised, fully horizontal position, SOL56 is de-energized, removing pressure from the top of CL12. The truck lift spring expands, lifting the smear truck to the tilted down position. Then SOL61 is de-energized, routing pressure to the bottom of CL12. As CL12 retracts, it moves a lever that pivots the smear truck up.

Figure 2.7-6 Smear Truck Assembly, Old Configuration

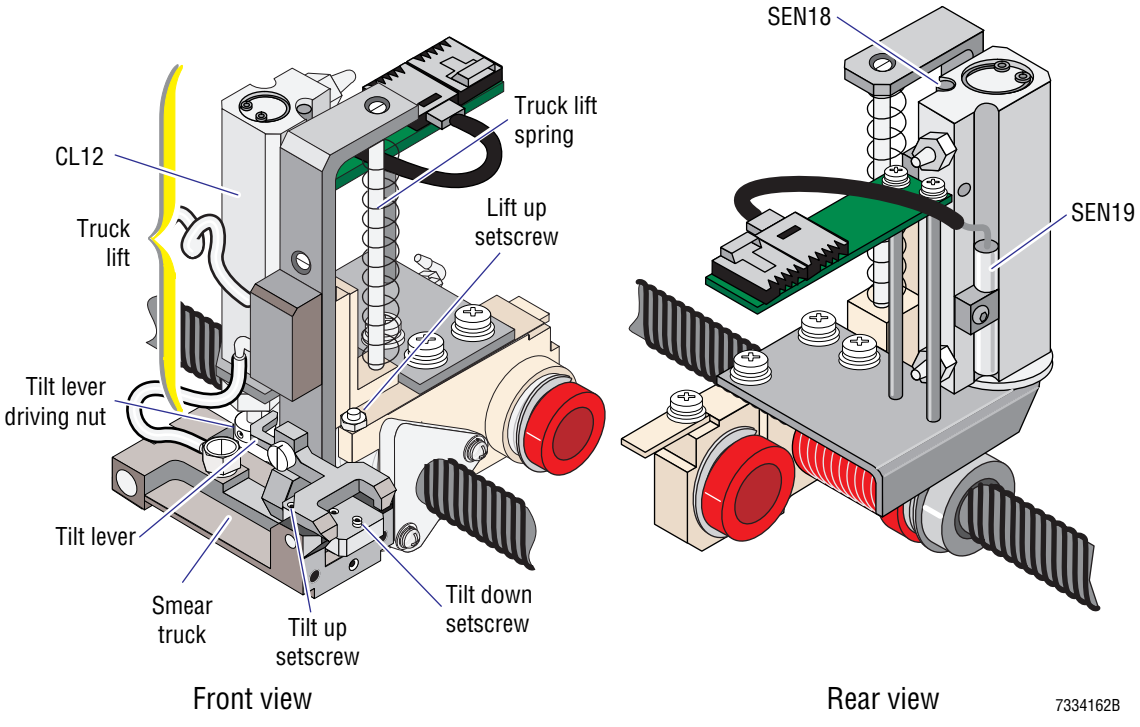
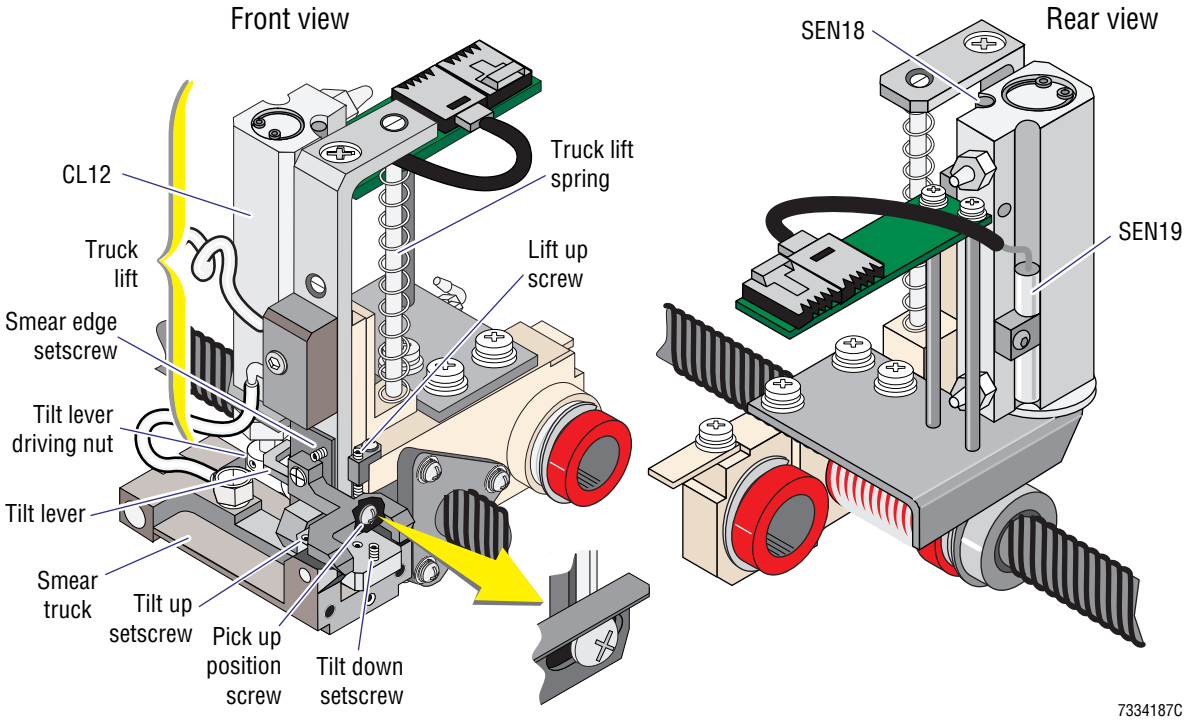


Figure 2.7-7 Smear Truck Assembly New Configuration



Two sensors, the truck lift down sensor, SEN19, and the truck lift up sensor, SEN18, monitor the position of the truck lift and generate error messages when the truck lift is not in the correct position.

Adjustments on the smear truck assembly allow you to adjust the positions of the smear truck. See Figures 2.7-6 and 2.7-7. For the procedure, see Heading 4.18, SMEAR TRUCK ALIGNMENT CHECKS AND ADJUSTMENTS.

To remove the smear truck assembly, a hole in the frame above the smear truck path provides screwdriver access to the three screws securing the assembly to the lead nut support housing.

The smear truck uses unregulated vacuum via VL43 to pick up and securely hold the slides. The truck vacuum switch sensor, SEN3, monitors the smear truck vacuum.

When a slide with a drop of blood is in the smear position, the smear truck moves to the Slide Ejector module and picks up a slide. The **pick offset** is calibrated to ensure the smear truck goes to the correct location to pick up the slide.

Holding the slide in position for making a wedge smear, the smear truck places the left edge of this spreader slide on the smear slide, moves the spreader slide through the drop of blood, and stops, allowing the blood to wick along the edge of the spreader slide. The **wick offset** is calibrated to ensure the smear truck stops at the correct location on the slide.

Then the smear truck pushes the spreader slide across the long direction of the smear slide, producing a wedge blood smear. The SlideMaker software varies the wicking time and the acceleration and velocity of the spreader slide, depending on the viscosity of the specimen. The wicking time, the acceleration, and the velocity can be adjusted to produce a thinner or

thicker smear, depending on customer preference. The adjustments are explained in the Online Help system topic, Define Smear Speed. The default settings are 5, 5, and 5. Changes to these settings are made at the discretion of the customer and are entirely their responsibility.

After making the smear, the Smear module transfers the labeled, wet slide to the Dryer module for drying. To move the slide from the shuttle to the Dryer module, SOL44 is de-energized to release the shuttle vacuum holding the slide on the shuttle, and SOL41 is energized, extending CL8. CL8 operates the slide pusher bars in the Smear module. The slide pusher bars push the wet slide from the shuttle onto the conveyer belts of the Dryer module. The slide transfer extended sensor, SEN10, senses when the pusher bars are fully extended.

After the wet slide is transferred to the Dryer module, SOL41 is de-energized, retracting CL8 and the slide pusher bars. The slide transfer retracted sensor, SEN9, senses when the slide pusher bars are retracted. Then the smear truck deposits the spreader slide on the shuttle. (The truck lift lowers the smear truck and SOL43 is de-energized, releasing the smear truck vacuum.) This spreader slide becomes the smear slide for the next sample of blood.

Alignment

The Smear module is integrated with the Slide Ejector module, the Dryer module and the Dispense module into one slide transport frame. Each module must be mounted accurately for the Smear module to perform correctly. For additional troubleshooting information, refer to Heading 7.3.

Voltage and High Vacuum Inputs

See Smear Module Input Tolerances under Heading A.1 for the acceptable ranges for the voltage and high vacuum inputs to the Smear module.

Smear/Transport Interface Card

Function

The Smear/Transport Interface card is located on the top, right side of the Slide and Smear module. Refer to Figure 2.7-1.

The Smear/Transport Interface card is an interface between all of the electrical components in the Slide and Smear module, except the servo motor, and the Main Distribution card. The Smear/Transport Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from the System Control card.
- Data signals to the System Control card.

Note: The servo motor, which requires high switched currents, is connected directly to the System Control card to avoid additional system noise.

In addition, the Smear/Transport Interface card routes signals from the eight fluid detectors, without modification, to the System Control card, via a dedicated cable. The fluid data signals are separated from all other signals to enable high quality signal transfer with minimum noise pickup.

Connectors and Test Points

The locations of the connectors and test points on the Smear/Transport Interface card are shown in Figure A.2-6 and described in Tables A.2-13 and A.2-14, respectively.

Calibration of the Slide Positions in the Slide and Smear Module

Calibrating the Shuttle Positions

The home, printer, and dispense offsets are used to adjust the smear, printer, and dispense positions of the shuttle, respectively. To verify and adjust these shuttle positions, see Heading 4.3.

Calibrating the Smear Truck Positions

The pick and wick offsets are used to adjust the pick and wick positions of the smear truck, respectively. To verify and adjust these smear truck positions, see Heading 4.4.

Sensor Summary

The sensors used by the Slide and Smear module are listed in Table 2.7-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4

Table 2.7-1 Slide and Smear Module Sensors

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
1	Servo reverse limit See Figure 2.7-1	Infrared interrupting Blocked = truck at reverse limit	Smear/Transport Interface	J10	J6, 7
2	Servo forward limit See Figure 2.7-1	Infrared interrupting Blocked = truck at forward limit	Smear/Transport Interface	J11	J6, 8
3	Truck vacuum See Figure 2.7-1	Vacuum-activated switch Closed = vacuum	Smear/Transport Interface	J12	J6, 9
4	Shuttle vacuum See Figure 2.7-1	Vacuum-activated switch Closed = vacuum	Smear/Transport Interface	J13	J6, 10
5	Print position See Figure 2.7-1	Infrared interrupting Blocked = shuttle at print position	Smear/Transport Interface	J14	J6, 11
6	Smear position See Figure 2.7-1	Infrared interrupting Blocked = shuttle at smear position	Smear/Transport Interface	J15	J6, 12
7	Dispense position See Figure 2.7-1	Infrared interrupting Blocked = shuttle at dispense position	Smear/Transport Interface	J16	J6, 13
9	Slide transfer retracted See Figure 2.7-1	Infrared interrupting Blocked = slide transfer mechanism retracted	Smear/Transport Interface	J18	J6, 15

Table 2.7-1 Slide and Smear Module Sensors *(Continued)*

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
10	Slide transfer extended See Figure 2.7-1	Infrared interrupting Blocked = slide transfer mechanism extended	Smear/Transport Interface	J19	J6, 16
18	Truck lift up See Figure 2.7-6 or Figure 2.7-7	Magnetic switch Closed = truck lift up	Smear/Transport Interface	J22	J6, 23
19	Truck lift down See Figure 2.7-6 or Figure 2.7-7	Magnetic switch Closed = truck lift down	Smear/Transport Interface	J22	J6, 5
58	Encoder A See Figure 2.7-1	Encoder	Smear/Transport Interface	J9	J6, 19
59	Encoder B See Figure 2.7-1	Encoder	Smear/Transport Interface	J9	J6, 20
60	Encoder I See Figure 2.7-1	Encoder	Smear/Transport Interface	J9	J6, 21

2.8 SMEAR PROCESSING SYSTEM: LABEL PRINTER MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Label Printer module. The Label Printer module is a dedicated label printer that prints labels and applies the labels to the slides.

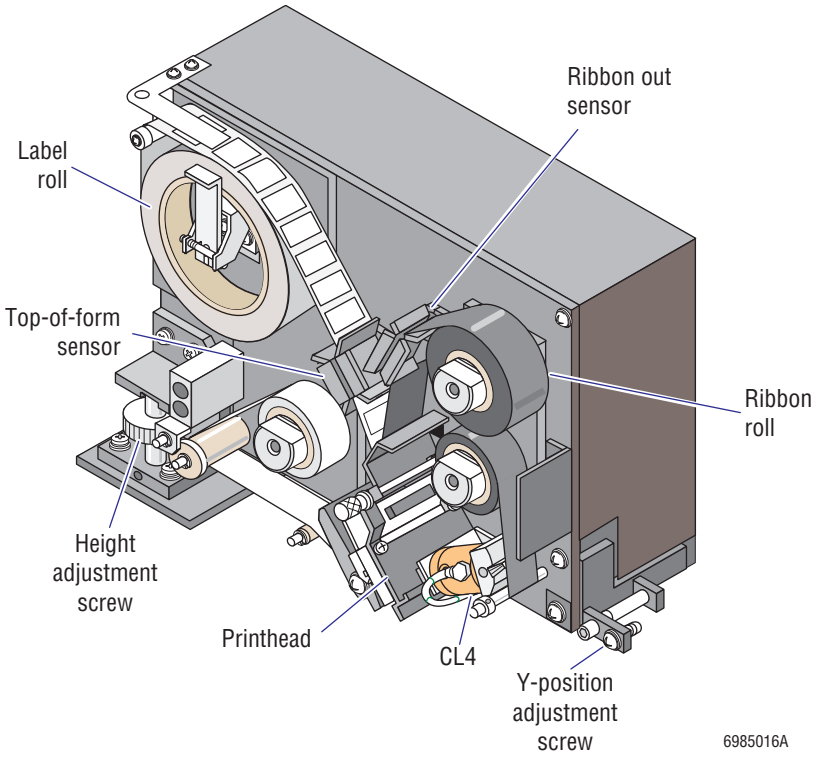
For more information on the smear processing system, see the Cassette Transport module (Heading 2.6), the Slide and Smear module (Heading 2.7), the Dryer module (Heading 2.9), the Slide Elevator module (Heading 2.10), and the Basket Queue module (Heading 2.11).

Description

The Label Printer module is mounted by screws to the Slide and Smear module. Refer to Figure 2.1-2.

The Label Printer module is supplied by an outside manufacturer as a complete assembly. See Figure 2.8-1. The Power Supply Monitor card supplies power directly to the Label Printer module. A ground strap connecting the Label Printer module chassis and a nearby chassis ground stud provide EMI and RFI shielding as well as antistatic protection. The Main Distribution card is the interface between the Label Printer module and the System Control card, routing the control and data signals to and from the Label Printer module via a serial data interface cable.

Figure 2.8-1 Label Printer Module Components



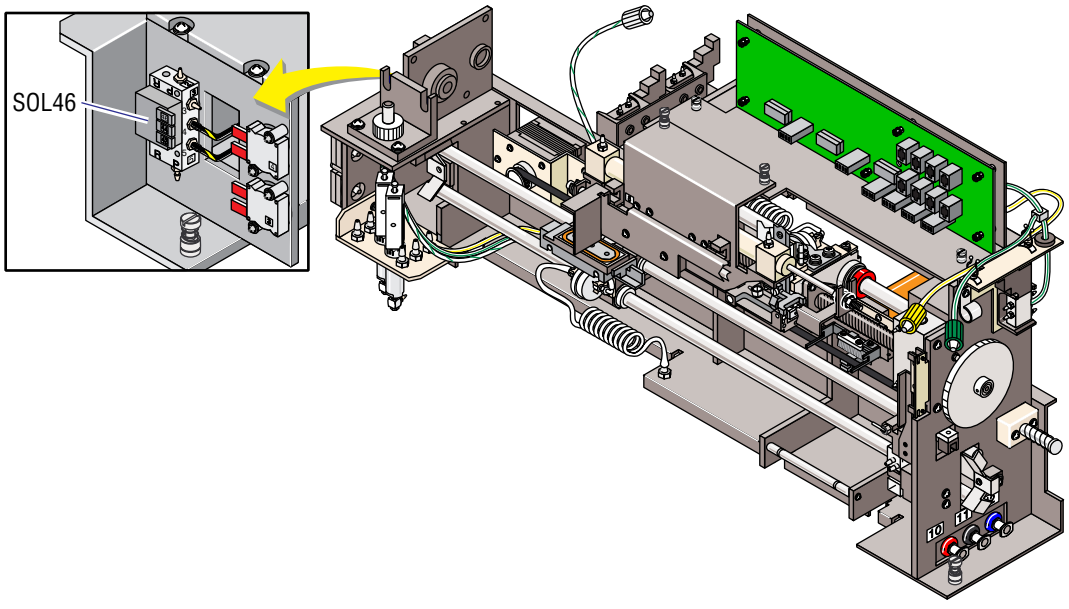
The Label Printer module:

1. Receives label data from the Workstation.
2. Uses the thermal transfer printing process to print the information onto a label received from a supply roll.
3. Peels the label from its backing and applies the label in proper orientation to the appropriate microscope slide. To apply a label to the slide:
   a. The shuttle moves the slide to the printer position, where the shuttle stops momentarily.
   b. The label dispenser advances, pulling the label over a sharp edge which starts peeling the label off the backing.
   c. The peeling end of the label sticks onto the slide.
   d. The shuttle reverses directions and starts moving at the same speed as the label dispenser. The label continues to unpeel, sticking onto the slide.

During initialization of the SlideMaker:

1. The Power Supply Monitor card applies power to the Label Printer module to turn the printer on and initialize the printer's electronics.
2. The printhead cylinder, CL4 (Figure 2.8-1), is extended, closing the printhead onto the label roll. SOL46, which is mounted on the Slide and Smear module (Figure 2.8-2), operates CL4.
3. The label roll advances and the top-of form-sensor (Figure 2.8-1) checks for labels. The label roll advances past three labels. The first is blank and the second and third are printed dummy labels.
4. The label roll stops with a label in position for printing.

Figure 2.8-2 Printhead Cylinder Solenoid

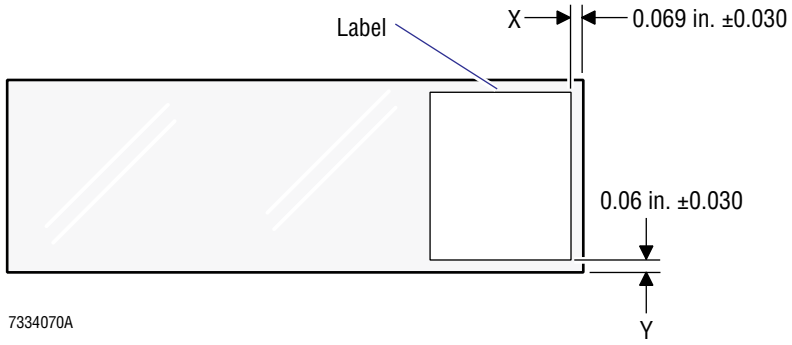


Field Adjustments

You can make four adjustments to the Label Printer module in the field:

- Change the print intensity level. This is done by the operator via software control (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ PRINTER LABEL FUNCTIONS**.)
- Increase or decrease the clearance between the slide and the label and ribbon rolls. This is accomplished by adjusting the height adjustment screw to raise or lower the Label Printer module. See Printer Height above the Slide Adjustment under Heading 4.5.
- Move the location of the label on the slide in the Y-dimension. See Figure 2.8-3. This is accomplished by adjusting the Y-adjustment screw to reposition the Label Printer module. See Label Position in the Y-Dimension Adjustment under Heading 4.5.

Figure 2.8-3 Correct Position of the Label on the Slide



- Move the location of the label on the slide in the X-dimension. See Figure 2.8-3. This is accomplished by adjusting the printer offset. See Setting the Printer Offset under Heading 4.3.

Sensor Summary

Three sensors affect the operation of the Label Printer module:

- Two sensors on the Label Printer module, the top-of-form sensor and the ribbon out sensor, monitor the label and ribbon supplies, respectively.
- A sensor on the Slide and Smear module, the print position sensor, SEN5, affects where the shuttle stops at the Label Printer module, and therefore the placement of the label on the slide. The print position sensor is discussed in more detail under Heading 2.7, SMEAR PROCESSING SYSTEM: SLIDE AND SMEAR MODULE, and is listed in Table A.4-1.

2.9 SMEAR PROCESSING SYSTEM: DRYER MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Dryer module. The Dryer module:

1. Receives a labeled, wet, smear slide from the Slide and Smear module.
2. Dries the smear.
3. Moves the smear to the Slide Elevator module.

This section also describes the Dryer Interface card.

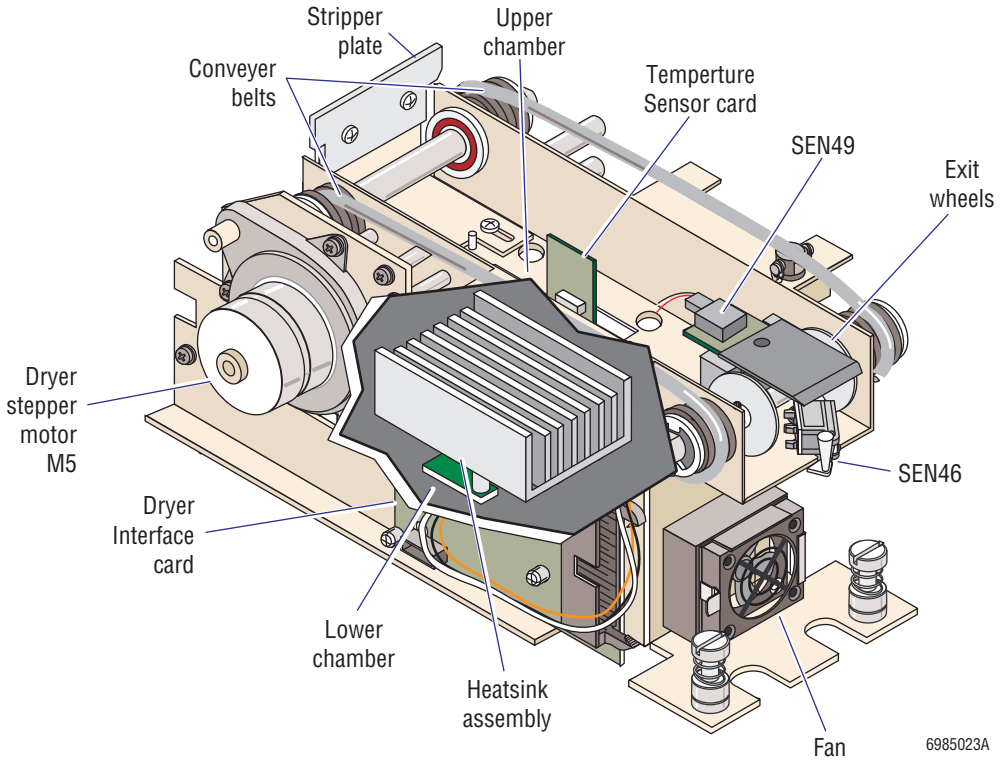
For more information on the smear processing system, see the Cassette Transport module (Heading 2.6), the Slide and Smear module (Heading 2.7), the Label Printer module (Heading 2.8), the Slide Elevator module (Heading 2.10), and the Basket Queue module (Heading 2.11).

Description

The Dryer module is mounted to the Slide and Smear module between the Cassette Transport module and the Dispense module. See Figure 2.1-2.

The Dryer module has two chambers, a lower chamber and an upper chamber. See Figure 2.9-1.

Figure 2.9-1 Dryer Module Components



A fan pulls air into the lower chamber through a filter which prevents dust particles from contacting the smear. In the lower chamber, the air passes through six choking holes to restrict the air flow and then through a heatsink assembly to heat the air. From the heatsink assembly, the warm air makes a U-turn and flows vertically through twelve holes on the top surface of the lower chamber into the upper chamber.

The upper chamber of the Dryer module is permanently sealed across the top and along both long sides, forming a slide-drying chamber with a gentle, hot air flow.

Two heat sensors in the Dryer module monitor the temperature:

- One heat sensor senses the temperature in the heatsink and is an integral part of the heatsink assembly. Refer to Figure 2.9-1.
- The other heat sensor senses the temperature in the upper chamber and is mounted on the Temperature Sensor card. Refer to Figure 2.9-1.

The ambient temperature thermistor and the circuitry for controlling the Dryer module temperature are on the System Control card. At powerup, sufficient current is supplied to the heatsink assembly to raise the heatsink temperature to about 20°C above the ambient temperature in a maximum of 3 minutes. During operation, the System Control card regulates the current to the heatsink assembly to maintain the drying temperature in the upper chamber at about 10°C above ambient temperature.

Slide pusher bars in the Smear module push the wet, smeared slide off the shuttle onto conveyor belts in the upper chamber of the Dryer module. The conveyor belts, belt/pulley mechanisms driven by the dryer stepper motor, M5, move the slide through the upper chamber at a constant, slow speed while maintaining the correct orientation of the slide. The warm air from the lower chamber contacts the underside of the slide, drying the smear as the slide moves through the upper chamber.

As the dried slide nears the exit of the Dryer module, the Dryer Exit Sensor card, SEN49 (Figure 2.9-1), senses the exiting slide. From this information, the SlideMaker calculates when the slide will drop onto the platen, determining when to close the gripper.

In addition, the SlideMaker counts the number of steps that the dryer stepper motor takes for each slide. If the motor takes too many steps before the SlideMaker senses an exiting slide, the SlideMaker considers the slide lost or fallen in the Dryer module and generates an error.

Dryer Interface Card

Function

The Dryer Interface card is located on the left side of the Dryer module. Refer to Figure 2.9-1.

The Dryer Interface card is an interface between the electrical components in the Dryer and the Slide Elevator modules and the Main Distribution card. The Dryer Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from the System Control card
- Data signals to the System Control card.

Connectors and Test Points

The locations of the connectors and test points on the Dryer Interface card are shown in Figure A.2-2 and described in Tables A.2-3 and A.2-4, respectively.

Sensor Summary

The sensors used by the Dryer module are listed in Table 2.9-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.9-1 Dryer Module Sensors

SEN No.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
49	Dryer Exit Sensor card See Figure 2.9-1	Pulsed infrared reflective (mounted on PCB) Reflection = slide at exit position	Dryer Interface	J3	J8, 11
	Temperature Sensor card See Figure 2.9-1	Temperature (mounted on PCB)			

2.10 SMEAR PROCESSING SYSTEM: SLIDE ELEVATOR MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Slide Elevator module. The Slide Elevator module:

1. Receives dried smear slides from the Dryer module.
2. Inserts the slides into slide baskets in the Basket Queue module.

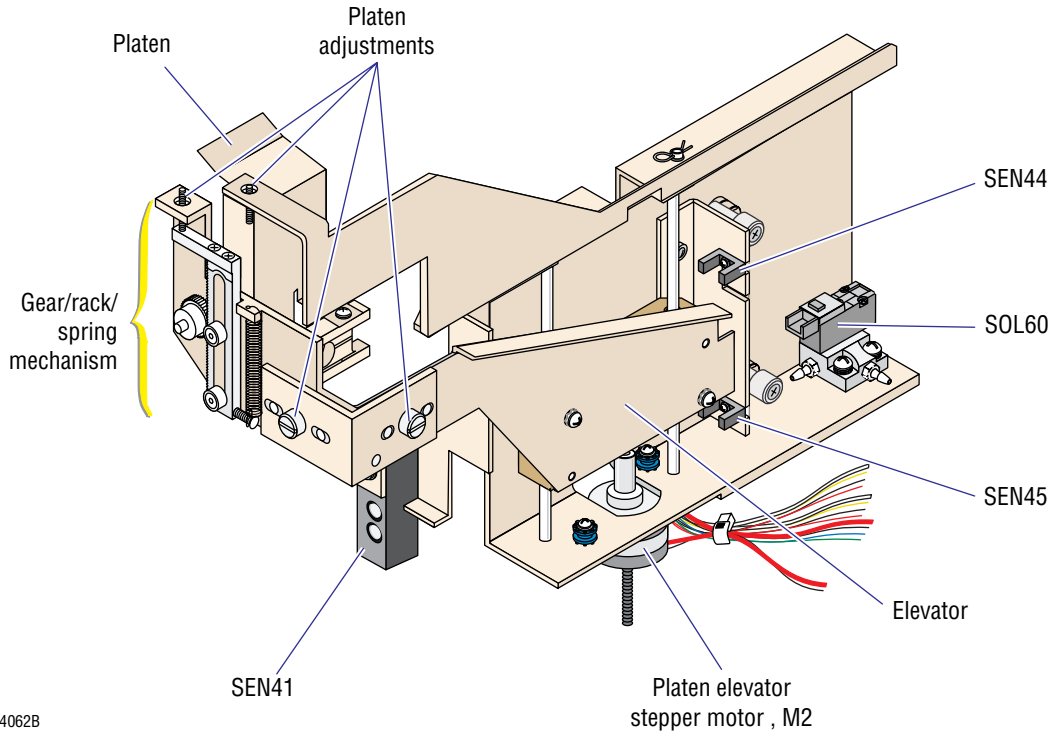
For more information on the smear processing system, see the Cassette Transport module (Heading 2.6), the Slide and Smear module (Heading 2.7), the Label Printer module (Heading 2.8), the Dryer module (Heading 2.9), and the Basket Queue module (Heading 2.11).

Description

The Slide Elevator module is mounted on the right side of the Dryer module. See Figure 2.1-2.

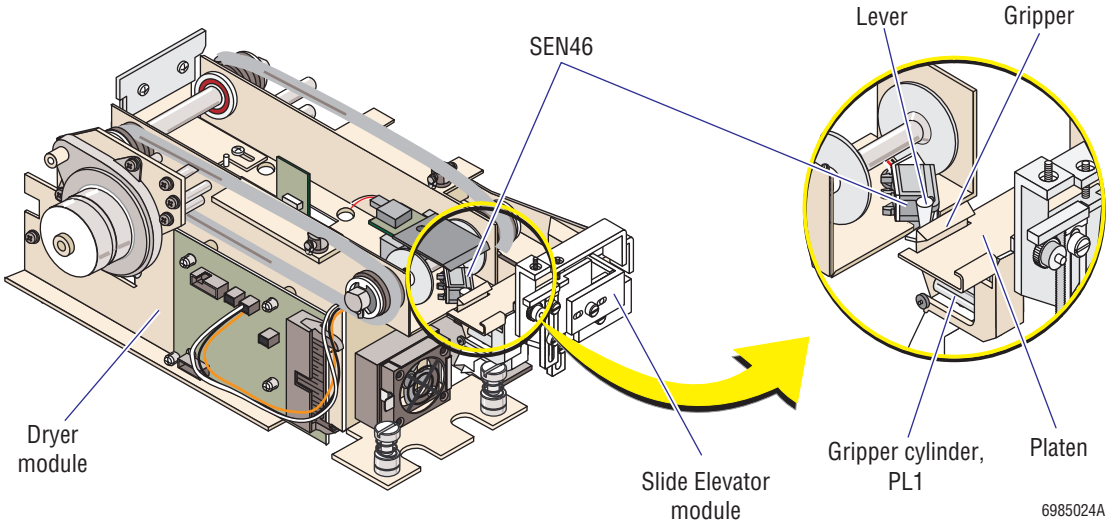
The Slide Elevator module consists of a guided slider driven by a stepper motor for moving the platen of the elevator up and down and a gear/rack/spring mechanism for rotating the platen. See Figure 2.10-1.

Figure 2.10-1 Slide Elevator Module Components



A gripper (slide retaining arm) secures the slide to the platen. See Figure 2.10-2.

Figure 2.10-2 Dryer Module and Slide Elevator Module Component Interaction



Force from the moving conveyer belts in the Dryer module and friction between the slide and the slide exit wheels move the slide from the belts onto the slide exit wheels which in turn drop the slide onto the platen of the Slide Elevator module. The platen is in the horizontal position with the gripper open, ready to receive a slide. SOL60 (Figure 2.10-1), which is normally energized, extends PL1 (Figure 2.10-2) to hold the gripper open.

When enough time has elapsed since SEN49 sensed a slide exiting the Dryer module for the slide to be on the platen, SOL60 is de-energized, PL1 retracts, and the spring in the gripper assembly closes the gripper on the slide. (For details about the function of SEN49, see Description under Heading 2.9, SMEAR PROCESSING SYSTEM: DRYER MODULE.)

The gripper overextended sensor, SEN46, monitors the position of the gripper to ensure a slide is on the platen. SEN46 is an infrared sensor and lever (flag) assembly mounted on the Dryer module but activated by movement of the gripper on the Slide Elevator module (Figure 2.10-2).

- When the gripper is fully closed, that is SOL60 is de-energized but no slide is on the platen, the lever just touches the back of the gripper and SEN46 is blocked.

  Note: SEN46 is adjusted so that the lever just touches the back of the gripper in this position.
- When the gripper is either fully open waiting for a slide, or partially closed holding a slide, the gripper moves the lever of SEN46, unblocking the sensor.

The gripper is activated up to three times to grip a slide. If after the third try SEN46 is still blocked, indicating no slide is on the platen, an error message is generated.

When a slide is on the platen, the platen elevator stepper motor, M2, moves the elevator down to the slide releasing position. As the elevator moves, the spring in the gear/rack/spring mechanism releases, rotating the platen 90 degrees.

When the elevator reaches the platen elevator down sensor, SEN45 (indicating the elevator is down), SOL60 is energized, releasing the gripper, and the slide falls into the basket slot.

After either the vertical slide sensor, SEN41, on the Slide Elevator module, or the basket index sensor, SEN37, in the Basket Transport module, confirm a slide is in the basket slot, the platen elevator stepper motor drives the elevator up until the elevator reaches the platen elevator up sensor, SEN44. The upward movement stretches the spring in the gear/rack/spring mechanism, rotating the platen back to the horizontal position.

The platen elevator stepper motor should move the slide elevator from the low point to the high point, or from the high point to the low point, in a fixed number of steps. If the motor takes more than that fixed number of steps by a certain margin, the SlideMaker generates an error.

Adjustments on the Slide Elevator module allow you to move the platen until the released slides are perpendicular to the basket slots and are centered in the basket slot. See Figure 2.10-1. For the adjustment procedure, see Heading 4.6, SLIDE ELEVATOR PLATEN ADJUSTMENTS.

Sensor Summary

The sensors used by the Slide Elevator module are listed in Table 2.10-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.10-1 Slide Elevator Module Sensors

SEN NO.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
37	Basket index See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked (blocked < 2.1 V, unblocked >3.4 V) = slide insertion space occupied (Slide is in the basket at this position, or the basket is not in position to receive a slide.)	Basket Transport Interface	J8	J7, 13
41	Vertical slide See Figure 2.10-1	Reflective infrared Reflection = slide present in drop position of basket	Dryer Interface	J5	J8, 5
44	Platen elevator up See Figure 2.10-1	Infrared interrupting Blocked = elevator is up, platen is horizontal	Dryer Interface	J11	J8, 8
45	Platen elevator down See Figure 2.10-1	Infrared interrupting Blocked = elevator is down, platen is vertical	Dryer Interface	J10	J8, 9

Table 2.10-1 Slide Elevator Module Sensors

SEN NO.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
46	Gripper overextended See Figure 2.10-2	Infrared interrupting Blocked = gripper fully closed indicating either no slide at platen or slide improperly placed at platen	Dryer Interface	J9	J8, 10
49	Dryer Exit Sensor card See Figure 2.9-1	Pulsed infrared reflective (mounted on PCB) Reflection = slide at exit position	Dryer Interface	J3	J8, 11

2.11 SMEAR PROCESSING SYSTEM: BASKET QUEUE MODULE

Summary

The smear processing system comprises six modules that process the smear from retrieval of a clean, microscopic slide to collection of a stain ready, whole-blood smear.

This section describes the Basket Queue module. The Basket Queue module:

1. Moves empty slide baskets to the Slide Elevator module to receive the dried slides (up to 12 per basket).
2. Moves the filled slide baskets (or in the case of a stat, the slide basket containing the stat slide) away from the Slide Elevator module.

The Basket Queue module can hold up to 12 slide baskets at any one time.

This section also describes the Basket Transport Interface card.

For more information on the smear processing system, see the Cassette Transport module (Heading 2.6), the Slide and Smear module (Heading 2.7), the Label Printer module (Heading 2.8), the Dryer module (Heading 2.9), and the Slide Elevator module (Heading 2.10).

Description

The Basket Queue module is located across the inside front of the SlideMaker. Refer to Figure 2.1-2

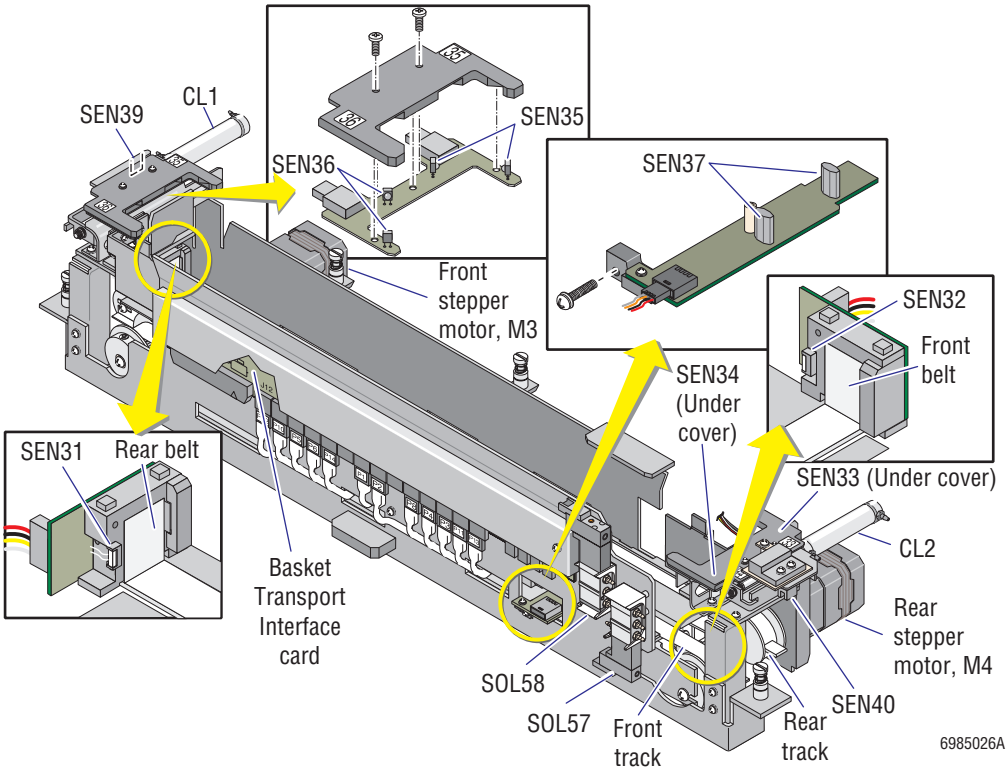
The Basket Queue module uses two independent belt/pulley tracks to move the slide baskets. See Figure 2.11-1. The rear (input) track, driven by the rear stepper motor, M4, advances the slide baskets from left to right, one basket slot at a time. The front (output) track, driven by the front stepper motor, M3, advances the slide baskets from right to left, a complete basket at a time. Cylinder operated crossover arms mounted on each end of the tracks transfer the slide baskets from one track to the other, so the baskets can continue to cycle within the module.

To move slide baskets from the rear (input) track to the front (output) track:

1. The rear belt position sensor, SEN31, identifies the home position of the rear track, determining if the rear track is aligned for transferring a slide basket. See Figure 2.11-1.
2. The front belt position sensor, SEN32, identifies the home position of the front track, determining if the front track is aligned for receiving a slide basket.
3. The basket rear right sensor, SEN33, senses a slide basket is present in the right corner of the rear track, ready for transfer. See Figure 2.11-1
4. The basket front right sensor, SEN34, senses when the right corner of the front track is empty.
5. SOL57 is energized, extending CL2. See Figure 2.11-1
6. CL2 operates the crossover arm, pushing the slide basket from the right corner of the rear track to the right corner of the front track.
7. The basket front right sensor, SEN34, senses when the slide basket is in the right corner of the front track.

8. SOL57 is de-energized, retracting CL2.
9. The right crossover home sensor, SEN40, senses when CL2 is fully retracted (at home).

Figure 2.11-1 Basket Queue Module Components



To move slide baskets from the front (output) track to the rear (input) track:

1. The rear belt position sensor, SEN31, identifies the home position of the rear track, determining if the rear track is aligned for receiving a slide basket.
2. The front belt position sensor, SEN32, identifies the home position of the front track, determining if the front track is aligned for transferring a slide basket. See Figure 2.11-1.
3. The basket front left sensor, SEN36, senses a slide basket is present in the left corner of the front track, ready for transfer. See Figure 2.11-1.
4. The basket rear left sensor, SEN35, senses when the left corner of the rear track is empty.
5. SOL58 is energized, extending CL1. See Figure 2.11-1.
6. CL1 operates the crossover arm, pushing the slide basket from the left corner of the front track to the left corner of the rear track.
7. The basket rear left sensor, SEN35, senses when the slide basket is in the left corner of the rear track.
8. SOL58 is de-energized, retracting CL1
9. The left crossover home sensor, SEN39, senses when CL1 is fully retracted (at home).

The rear track advances the slide baskets until the basket index sensor, SEN37, senses that an empty slot is positioned under the point where the platen of the slide elevator is vertical. The Slide Elevator module inserts the next slide into the empty slot.

After either the basket index sensor, SEN37, in the Basket Queue, or the vertical slide sensor, SEN41, in the Slide Elevator module, confirm a slide is in the slot, the rear track advances the slide baskets until the next empty slot is in position for receiving a slide. During initialization, the rear track also advances the slide baskets until the basket index sensor finds the next empty slot.

The operator can insert or remove slide baskets from any position on the tracks except immediately under the Slide Elevator module. When the operator opens the basket cover, the basket cover interlock, SEN54, is activated and movement of the tracks is decelerated.

Service can readjust the basket cover interlock switch as necessary by loosening the hardware and moving the switch to the required position.

Basket Transport Interface Card

Function

The Basket Transport Interface card is located on the front of the Basket Queue module. Refer to Figure 2.11-1.

The Basket Transport Interface card is an interface between the electrical components in the Basket Queue module and the Main Distribution card. The Basket Transport Interface card routes, via the Main Distribution card:

- Power from the Power Supply Monitor card.
- Control signals from and data signals to the System Control card.
- Data signals to the System Control card.

In addition, a comparator circuit on the Basket Transport Interface card precisely locates the threshold for the basket/slide index sensor, SEN37.

Connectors and Test Points

The locations of the connectors and test points on the Basket Transport Interface card are shown in Figure A.2-1 and described in Tables A.2-1 and A.2-2, respectively.

Sensor Summary

The sensors used by the Basket Queue module are listed in Table 2.11-1. For a complete list of sensors used in the SlideMaker, and a description of the types of sensors used, see Heading A.4.

Table 2.11-1 Basket Queue Module Sensor

SEN NO.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
31	Rear belt position See Figure 2.11-1	Infrared interrupting, 4 piece, (mounted on PCB) Blocked = rear belt profile in center of sensor	Basket Transport Interface	J1	J7, 7

Table 2.11-1 Basket Queue Module Sensor *(Continued)*

SEN NO.	Name/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
32	Front belt position See Figure 2.11-1	Infrared interrupting, 4 piece, (mounted on PCB) Blocked = front belt profile in center of sensor	Basket Transport Interface	J2	J7, 8
33	Basket rear right See Figure 2.11-1	Infrared interrupting, 2 piece, (mounted on PCB) Blocked = basket present at right rear position	Basket Transport Interface	J3	J7, 9
34	Basket front right See Figure 2.11-1	Infrared interrupting, 2 piece, mounted on PCB Blocked = basket present at right front position	Basket Transport Interface	J4	J7, 10
35	Basket rear left See Figure 2.11-1	Infrared interrupting, 2 piece, mounted on PCB Blocked = basket present at left rear position	Basket Transport Interface	J5	J7, 11
36	Basket front left See Figure 2.11-1	Infrared interrupting, 2 piece, mounted on PCB Blocked = basket present at left front position	Basket Transport Interface	J6	J7, 12
37	Basket index See Figure 2.11-1	Infrared interrupting, 2 piece, mounted on PCB Blocked = slide insertion space occupied (slide is in the basket at this position, or the basket is not in position to receive a slide.) Blocked <2.1 V, unblocked >3.4 V	Basket Transport Interface	J8	J7, 13
39	Left crossover home See Figure 2.11-1	Infrared interrupting Not blocked = left crossover cylinder at home position	Basket Transport Interface	J10	J7, 15
40	Right crossover home See Figure 2.11-1	Infrared interrupting Not blocked = right crossover cylinder at home position	Basket Transport Interface	J11	J7, 16
41	Vertical slide See Figure 2.10-1	Reflective infrared Reflection = slide present in drop position of basket	Dryer Interface	J5	J8, 5
54	Basket cover interlock	Magnetic reed switch Open = basket cover open	Basket Transport Interface	J14	J7, 5

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3.1 PREINSTALLATION CHECKLIST

Before you install the instrument, verify the following conditions are met. Report any discrepancies on the Installation Report.

Space and Accessibility

✓ The space is sufficient for the SlideMaker. The dimensions and requirements for accessibility are shown in Figure 3.1-1 (GEN•S System) and Figure 3.1-2 (LH 750 System).

Figure 3.1-1 Space and Accessibility Requirements for the GEN•S SM SlideMaker

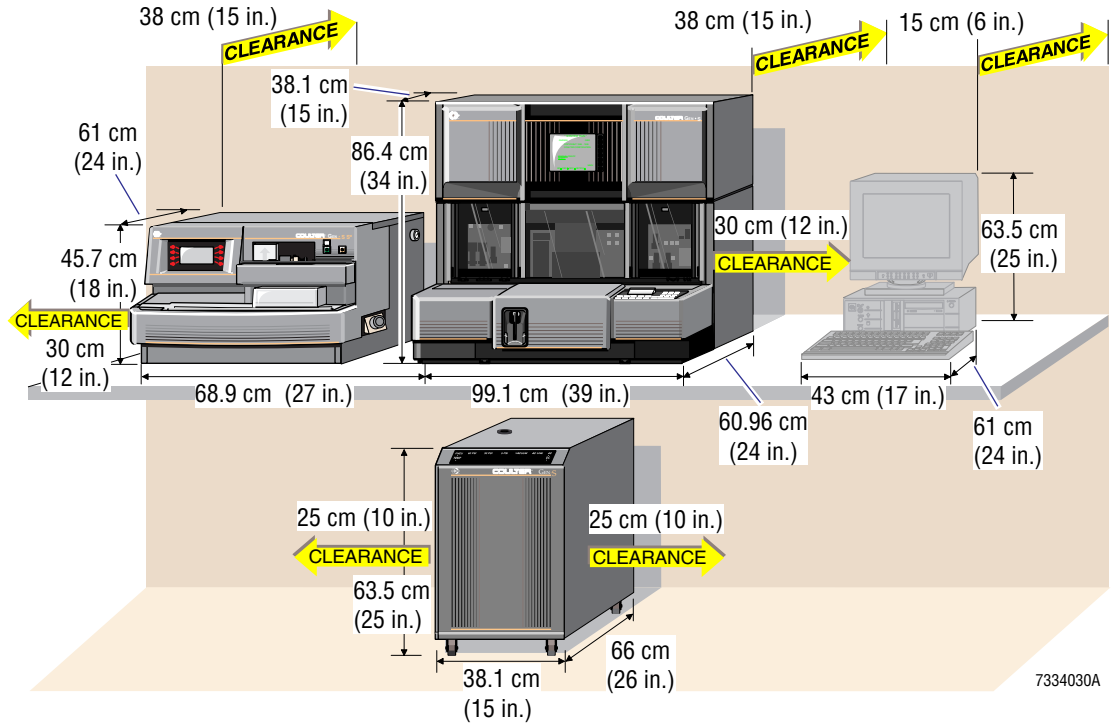
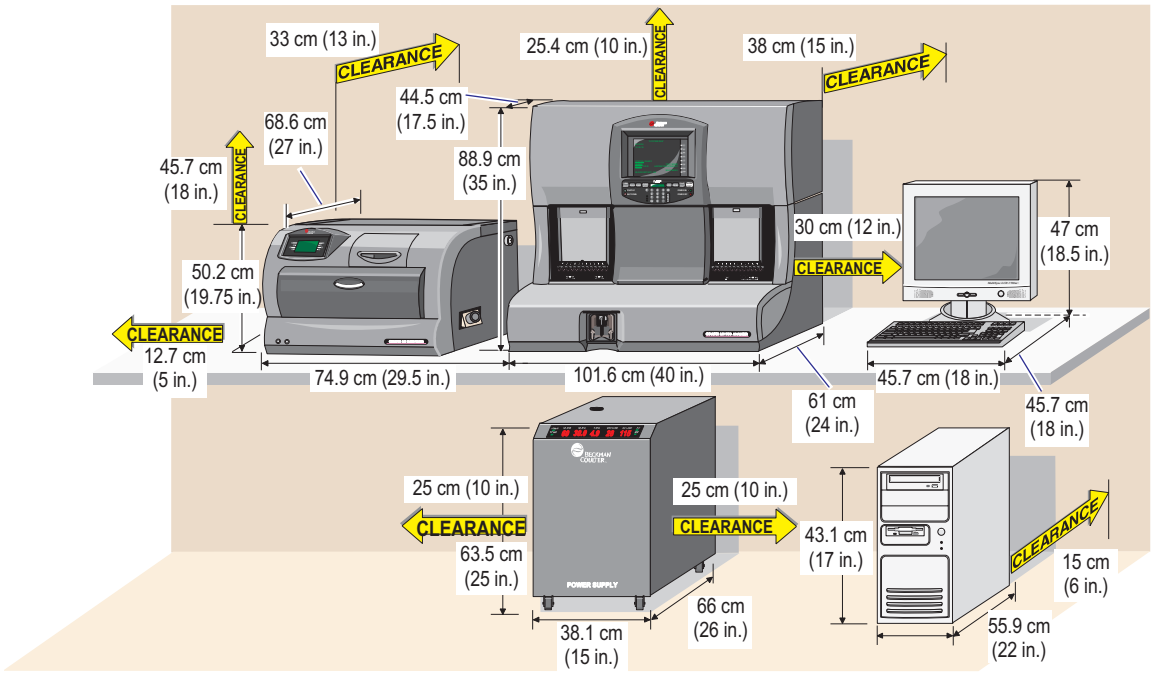


Figure 3.1-2 Space and Accessibility Requirements for the LH SlideMaker



Electrical Requirements

✓ An ac outlet is within 1.2 m (4 ft) of the area designated for the SlideMaker.

System Requirements

GEN•S System

✓ The following components are installed in the GEN•S System:

- Diluter Processor card, PN 6705943, rev B
- Diluter 2 card, PN 6706632, rev A
- Diluter 3 SlideMaker Interface card, PN 6706591, rev A
- Diluter lower front cover with a cutout on the left for connecting the SlideMaker
- GEN•S System Analytical Station software, rev 2C1 or higher
- GEN•S System Workstation software, rev 2C1 or higher

✓ One of the following **universal** pickup tubes is installed in the cleaning agent container:

- Cleaning agent pickup tube, PN 6706295
- Cleaning agent pickup tube, PN 6706296

✓ If the Analytical Station uses the diluent reservoir, the following **universal** pickup tube is installed in the diluent container:

- Diluent pickup tube, PN 6706295

LH 750 System

All LH 750 Systems are LH SlideMaker compatible.

3.2 UPGRADING THE ANALYTICAL STATION

GEN•S System

Tools/Supplies Needed

- ❑ Any components needed to meet the System Requirements listed in Heading 3.1, PREINSTALLATION CHECKLIST.

Procedure

1. If the Diluter Processor card, Diluter 2 card, or Diluter 3 SlideMaker Interface card in the GEN•S System is not the correct version for using a SlideMaker, install the correct versions of those cards:
   - To replace the Diluter Processor card, refer to Heading 4.6, Analyzer Card and Scope Module Replacement, in the Analytical Stations service manual.

   ATTENTION: If you replace the Diluter 2 card, adjust the bubble/blood detectors in the Diluter now, while you can still access the left side of the Diluter. Refer to Heading 4.55, Bubble/Blood Detector Replacement and Adjustment, in the Analytical Stations Service Manual.

   - To replace the Diluter 2 card or the Diluter 3 SlideMaker Interface card, refer to Heading 4.7, Diluter Card Replacement, in the Analytical Stations Service Manual.
2. If the lower front cover of the Diluter does not have a cutout for the connection to a SlideMaker:
   a. Power down the GEN•S System. Refer to Heading 4.1, Power Up/Power Down, in the Analytical Stations Service Manual.
   b. Remove the current lower front cover of the Diluter, retaining all the captive hardware.
   c. Install a new cover, ensuring all the captive hardware is transferred to the new cover.
3. If the diluent and cleaning agent pickup tubes for the GEN•S System do not have ports for the SlideMaker reagent lines, replace the pickup tubes.

LH 750 System

All LH 750 Systems are LH SlideMaker compatible.

3.3 MODIFYING THE ANALYTICAL STATION

Tools/Supplies Needed

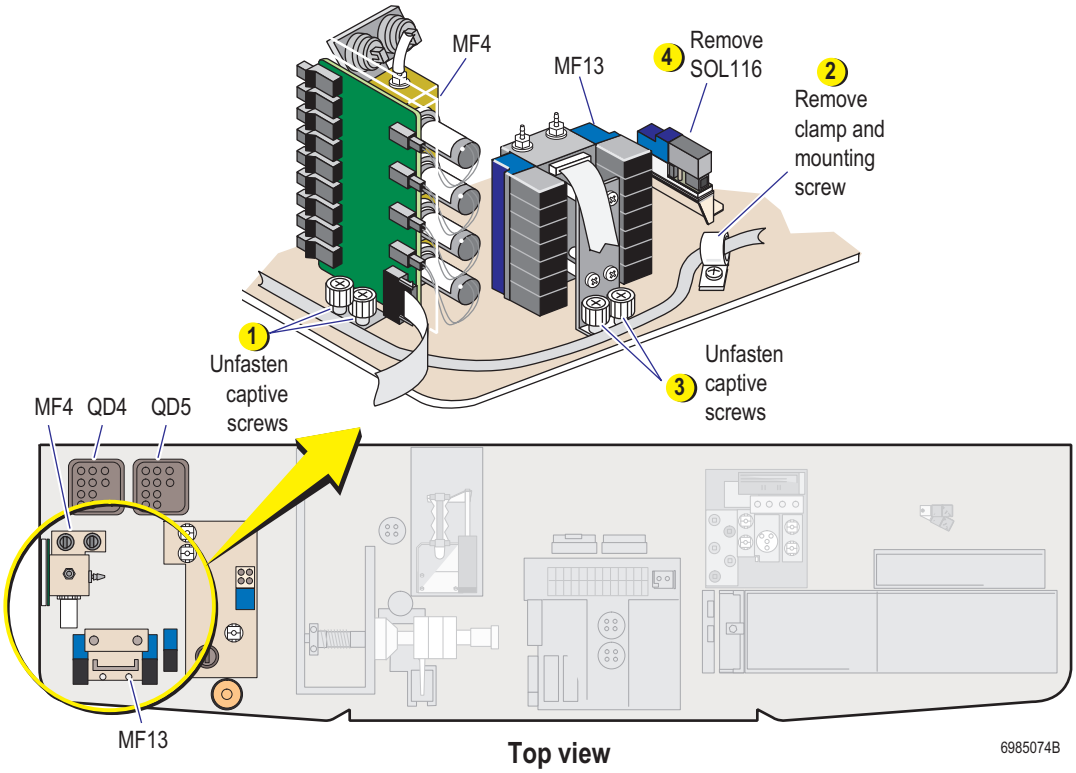
Unpack the Integration Kit, PN 6605418 (GEN•S System) or PN 6605747 (LH 750 System), and verify the contents against the packing list. For this section, you need the following items from the kit:

- ❑ 1.2 m (4 ft) of green/black-striped, polyurethane tubing, PN 3202217 (for lengthening tubing from MF13 to QD5 and for connecting SOL116 to VL116.)
- ❑ 8 cm (3 in.) of brown-striped, silicone tubing, PN 3213163 (for lengthening tubing from CV45 to FT13D)
- ❑ Sample Access and Reservoir module without the reservoir rod, PN 6805565
- ❑ One Sample Access and Reservoir module to SlideMaker Interface card cable, PN 6028773
- ❑ One SOL120 to SlideMaker Interface cable, PN 6806194
- ❑ One interface bracket, PN 6806095, assembled with:
  - One black, mini pinch valve, PN 6857096 (VL116 for retubing the vent chamber, VC19)
  - Two fluid detector mounts, PN 1023417
  - Two fluid detectors, PN 6805569 (BD3 and FD1 for aspirate line at needle vent)
  - One cable clamp, PN 6028733
  - One pinch valve locking ring, PN 6232382
- ❑ One Y-fitting, 0.062 i.d., PN 9909059 (for retubing the vent chamber, VC19)
- ❑ 10 cm (4 in.) green-striped, silicone tubing, PN 3203026 (for retubing the vent chamber, VC19)
- ❑ One union fitting, 0.125 i.d. to 0.093 i.d., PN 6232352 (reducer for connecting green striped tubing to vent chamber, VC19)
- ❑ 0.69 cm (0.27 in.) of yellow-striped, silicone tubing, PN 3213176 (sleeve for tubing on needle vent)
- ❑ One housing interface bracket, PN 6806035 (for GEN•S SM SlideMaker only)
- ❑ One white nylon, female Luer fitting, PN 6232382 (for connecting SOL116 on the Sample Access and Reservoir module to VL116 on the interface bracket)
- ❑ Bridge cover, PN 1023565

Installing the Sample Access and Reservoir Module

1. Remove the SlideMaker interface cover from the lower door of the Diluter.
2. Make space in the Diluter for installation of the Sample Access and Reservoir module:
   a. Unfasten the captive screws for MF4 and move MF4 as needed for easier access to the area. See Figure 3.3-1
   b. If present, remove the cable clamp and the mounting screw securing the grey, Diluter 4 card to stain and diff heaters cable to the bottom of the Diluter, and dress the cable out of the way.

Figure 3.3-1 Making Space for the Sample Access and Reservoir Module



c. Unfasten the captive screws for MF13.

d. If this is a GEN•S System field retrofit, lengthen the tubing from MF13 to QD5, if necessary -

1) Disconnect QD5. See Figure 3.3-1.

2) Remove MF13 and replace all of the green and black striped tubing with the same color tubing cut to 13 cm (5 in.) lengths.

Note: Applying a small amount of cleaning agent on the fittings as a lubricant will aid tubing installation.

3) Reconnect QD5, but leave MF13 loose.

e. If SOL116 is installed next to MF113 as shown in Figure 3.3-1, remove and discard SOL116 -

1) Remove the screw securing SOL116.

2) Disconnect the cable to SOL116 from the Diluter 3 card.

3) Remove the tubing from SOL116 to MF113 from both top fittings on MF113.

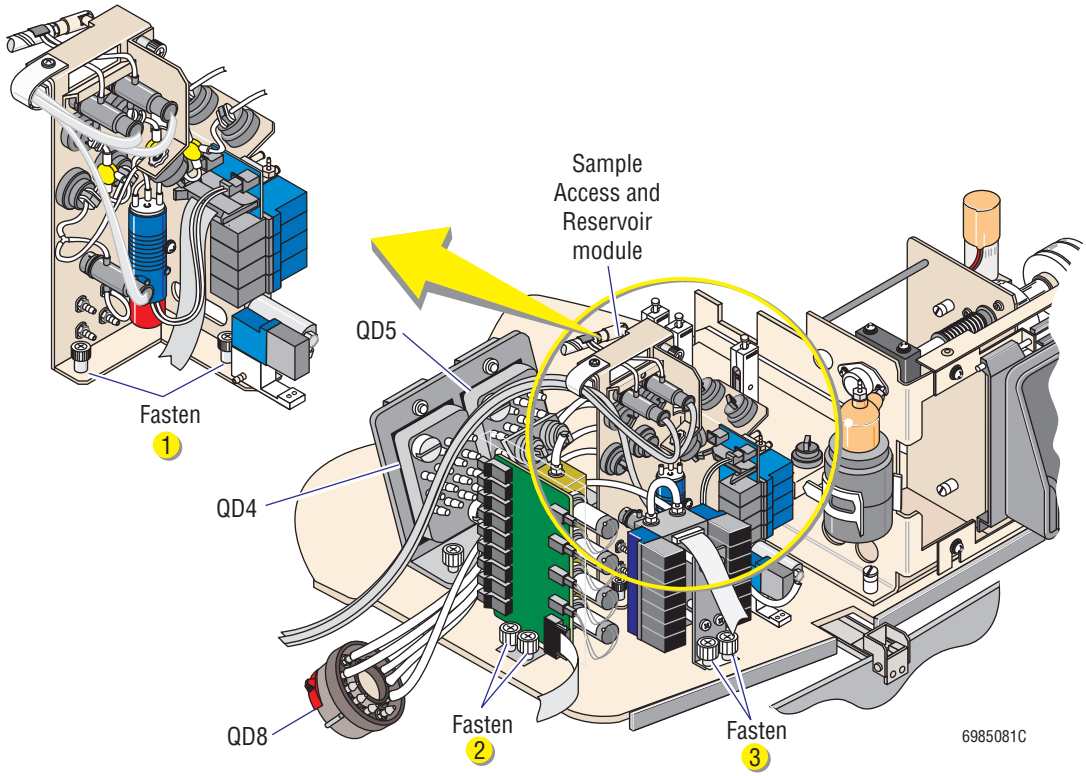
4) Cut the tubing from SOL116 to VL116 about 5 cm (2 in.) from SOL116.

Note: This tubing will be connected later in this procedure.

3. Remove the red pinch valve deactivator clip from the pinch valve in the Sample Access and Reservoir module.

4. Insert the Sample Access and Reservoir module in the space provided in front of QD5, routing the QD8 connector between MF4 and QD4 for later connection to the SlideMaker. See Figure 3.3-2.

Figure 3.3-2 Inserting and Securing the Sample Access and Reservoir Module

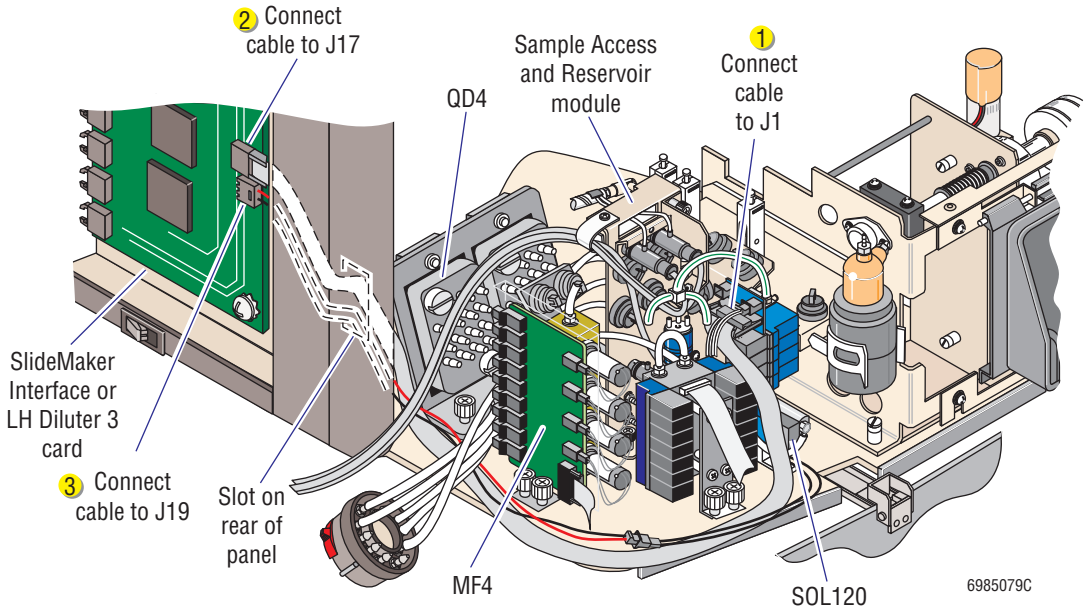


5. Ensure no tubing is trapped under or around the Sample Access and Reservoir module, then fasten the captive screws on the module.
6. Fasten the captive screws on MF4 and MF13.

ATTENTION: Later in this procedure you will install a splash shield over the Sample Access and Reservoir module. For that shield to fit correctly, you must route the cables as described in step 7, below.

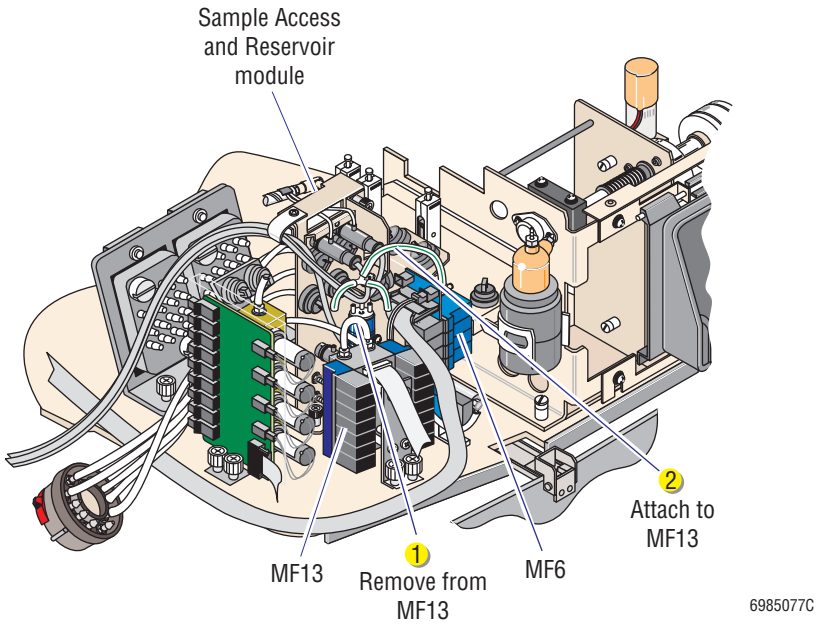
7. Connect the Sample and Access and Reservoir module to SlideMaker Interface card cable:
   a. Connect the 10-pin ribbon cable (the Sample Access and Reservoir module to SlideMaker Interface card cable), connector P6, to J1/MF6 on the Sample Access and Reservoir module. See Figure 3.3-3.
   b. Route the ribbon cable to the left around MF4, between QD4 and the left body of the Diluter, and through the slot at the left bottom of the Diluter.
   c. Connect the other end of the ribbon cable, connector P17, to J17 on the SlideMaker Interface card. See Figure 3.3-3.
   d. Route the cable from SOL120 (Figure 3.3-3) to the left around MF4, between QD4 and the left body of the Diluter, and through the slot at the left bottom of the Diluter.
   e. Connect the cable from SOL120 to J19 on the SlideMaker Interface or LH Diluter 3 card. See Figure 3.3-3.

Figure 3.3-3 Installing the Sample Access and Reservoir Module to SlideMaker Interface Card Cables



8. If still connected, remove the tubing from the top of MF13.
9. Connect the tubing with the green-striped tubing from MF6, port 1, in the Sample Access and Reservoir module to the top of MF13. See Figure 3.3-4.

Figure 3.3-4 Connecting MF6 in the Sample Access and Reservoir Module to MF13



10. Modify the aspiration path for the Sample Access and Reservoir module.
    - For GEN•S Systems, go to Modifying the Aspiration Path - GEN•S Systems.
    - For LH 750 Systems, go to Modifying the Aspiration Path - LH 750 Systems.

Modifying the Aspiration Path - GEN•S Systems

1. Install VL25 on the interface bracket.
   a. If the interface bracket in the Integration kit is preassembled with two fluid detectors, BD3 and FD1, remove the fluid detectors from their mounts and set them aside for later in the procedure. See Figure 3.3-5.
   b. If the Analytical Station has VL116 and its associated bracket installed, remove and discard them.

      Note: In the original GEN•S Systems, VL116 was not installed or used until the Analytical Station was modified for the SlideMaker. Now VL116 is mounted on a bracket and installed in the Analytical Station at the factory, and is used with or without the SlideMaker. When modifying these Analytical Stations for the SlideMaker, VL116 and its bracket are removed and replaced with the interface bracket from the Integration kit.
   c. Locate VL25, the unsecured black, mini pinch valve near the needle vent chamber, VC19. See Figure 3.3-6.
   d. Disconnect the green-striped tubing from the bottom of VL25.
   e. If this is a field retrofit, replace the brown-striped tubing between CV45 and the T-fitting FT13D with a longer piece (about 8 cm [3 in.]) of the same type tubing. For location of the tubing, see Figure 3.3-6.

Figure 3.3-5 Interface Bracket with Fluid Detectors Removed

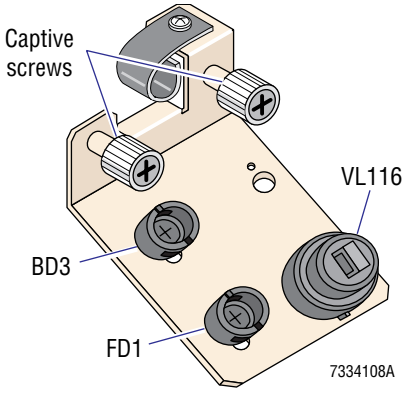
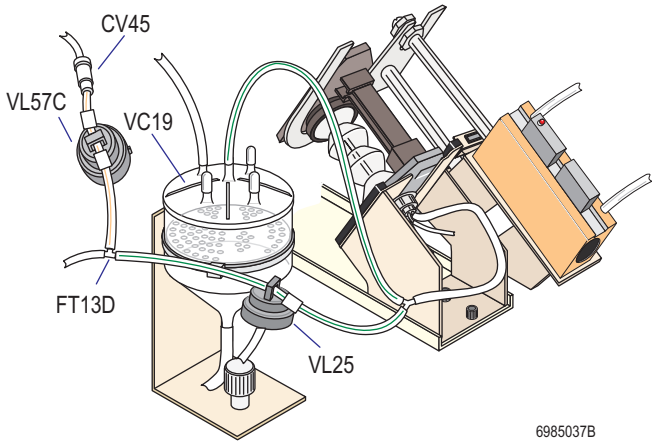


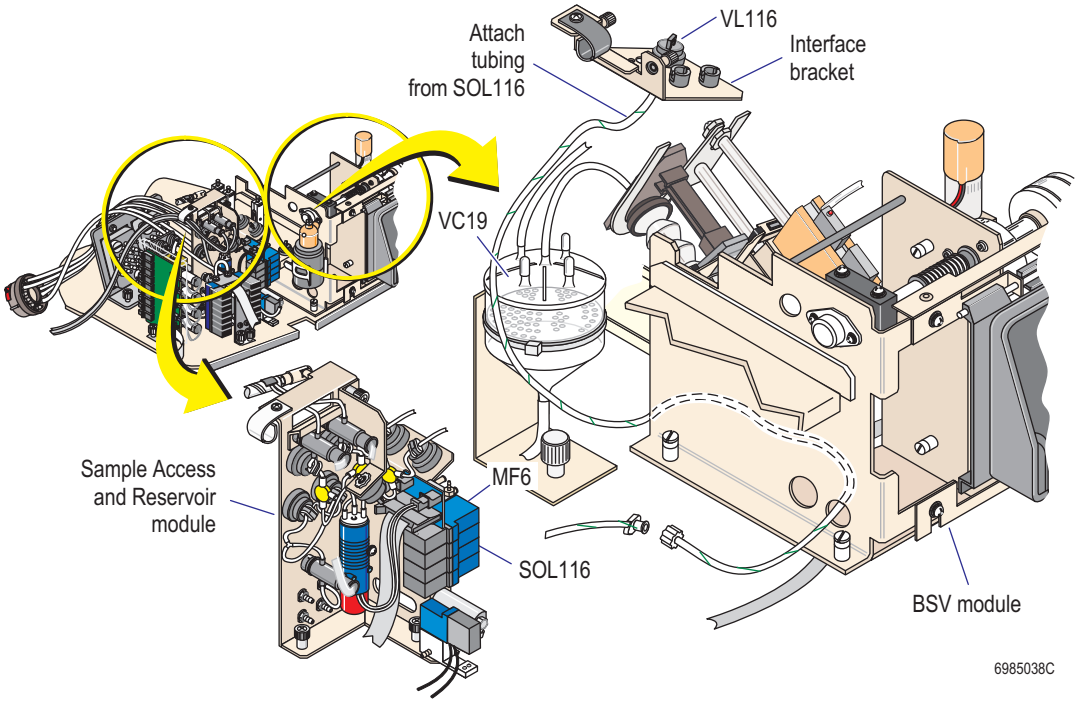
Figure 3.3-6 Locating VL25



   f. Install VL25 in the open position on the interface bracket (Figure 3.3-5) using the locking ring provided.
   g. Replace the green-striped tubing originally connected to the bottom of VL25 with a longer piece (19 cm [7.5 in.]) of the same type tubing, and connect the tubing to the bottom of VL25.
2. Attach 19.05 cm (7.5 in.) of green/black striped tubing to the white, female Luer fitting in the Integration Kit, and connect the fitting to the male Luer fitting in the tubing from the Sample Access and Reservoir module, MF6, SOL116, port 6.

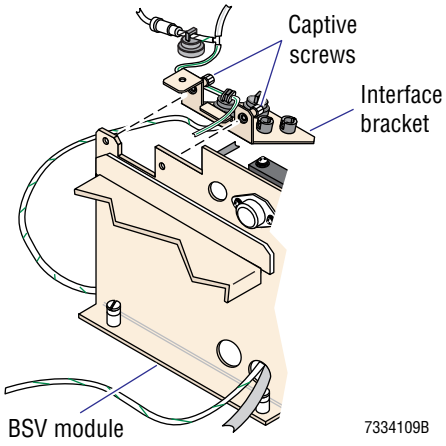
3. Feed the tubing from SOL116, port 6, through one of the openings in the BSV module to the interface bracket, and connect the tubing to the bottom of VL116. See Figure 3.3-7.

Figure 3.3-7 Connecting Actuator Tubing to VL116



4. Install the interface bracket on the BSV module as shown in Figure 3.3-8.

Figure 3.3-8 Installing the Interface Bracket



5. Connect the tubing from the Sample Access and Reservoir module to the needle assembly area:
   a. Connect the 13 cm (5 in.) tubing from VL115 on the Sample Access and Reservoir module to the support leg of a Y-fitting using 0.64 cm (0.25 in.) of yellow-striped tubing as a sleeve to secure the tubing. See Figure 3.3-9.
   b. Remove the tubing and Y-fitting previously connecting the needle vent fitting to VC19. See Figure 3.3-10.

      Note: This step leaves the green-striped silicone tubing through VL25 unattached and a port on VC19 open.

Figure 3.3-9 Connecting Tubing from VL115 to Y-Fitting

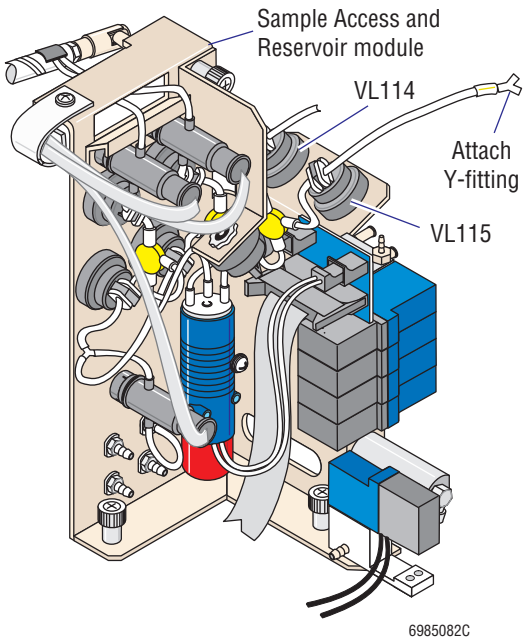
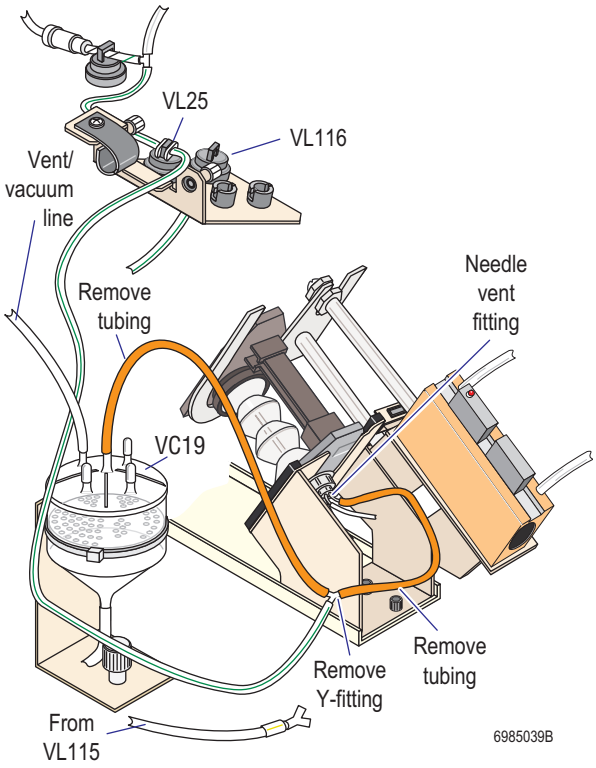


Figure 3.3-10 Removing Tubing from Needle Vent to VC19



c. Connect the green-striped tubing from VL25 to the second leg of the Y-fitting as shown in Figure 3.3-11, ensuring the red critical length tubing marker is positioned between the Y-fitting and VL25.

d. Connect a 10 cm (4 in.) length of green-striped, silicone tubing to the third leg of the Y-fitting. See Figure 3.3-12.

Figure 3.3-11 Connecting Pinch Tubing from VL25 to Y-Fitting

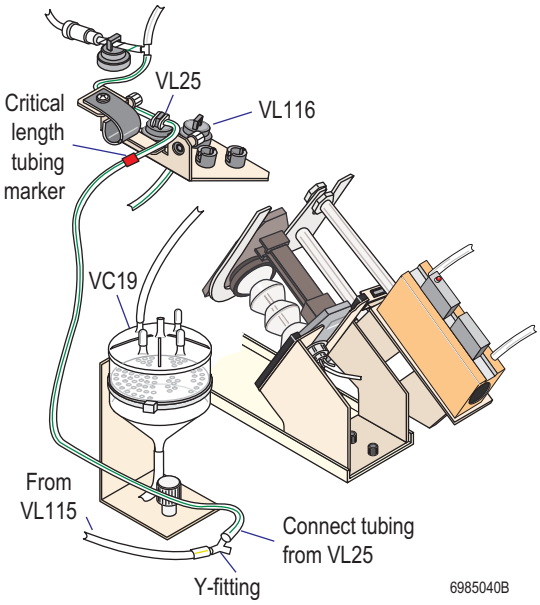
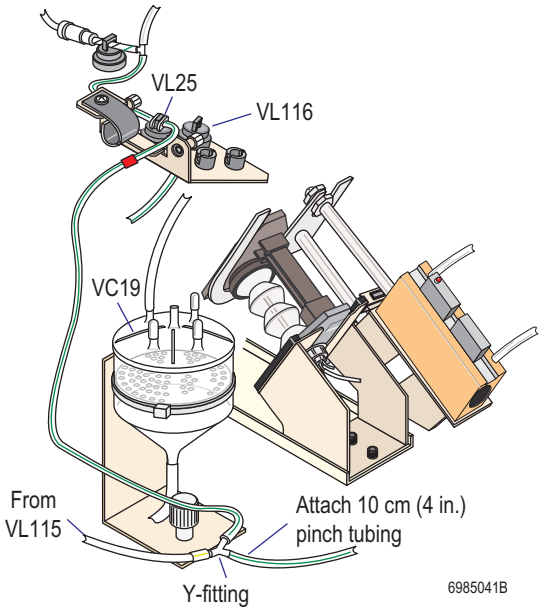


Figure 3.3-12 Attaching Pinch Tubing to Y-Fitting



e. Route the other end of the 10 cm (4 in.) green-striped, silicone tubing through the new pinch valve, VL116, to the open port on VC19 via a reducer (union) fitting and 25 mm (1 in.) of green/black-striped polyurethane tubing as shown in Figure 3.3-13.

f. Locate the two fluid detectors needed in step g. If you removed two fluid detectors from the integration bracket earlier in this procedure, use those.

g. Route the 23 cm (9 in.) tubing from VL114 on the Sample Access and Reservoir module through BD3 and then FD1, leaving about 8.9 cm (3.5 in.) of tubing extending from FD1.

h. Install the two fluid detectors into their mounts on the interface bracket.

ATTENTION: When you install a protective tubing sleeve on the needle vent port, if you do not push the sleeve completely onto the fitting it can cause the tubing to kink.

i. Connect the tubing extending from FD1 to the open vent port of the needle, using 8.3 cm (3.25 in.) of yellow-striped tubing as a protective sleeve to secure the tubing. See Figure 3.3-14. Ensure that both the tubing and its sleeve are pushed onto the needle vent port.

Note: The tubing sleeve ensures the correct distance is maintained between FD1 and the needle vent port and prevents the aspirator tubing from kinking on the needle vent port.

Figure 3.3-13 Routing Pinch Tubing through VL116 to VC19

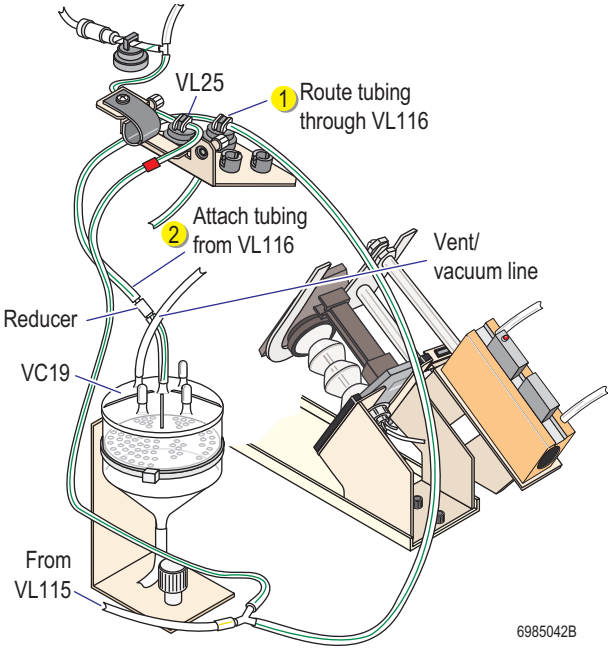
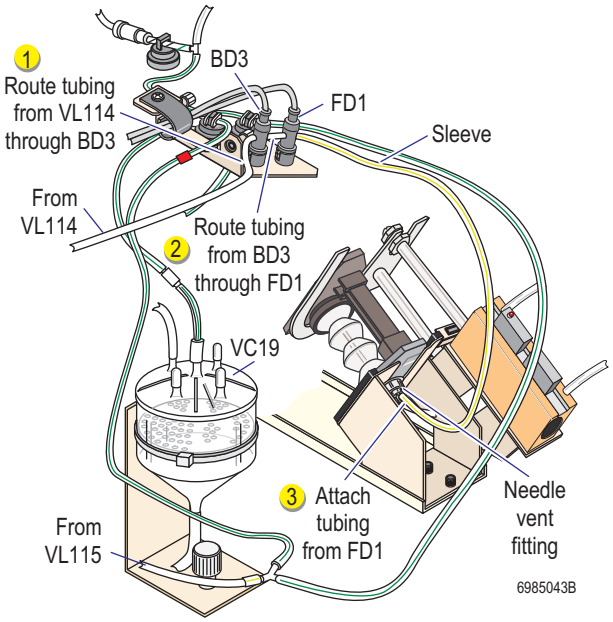
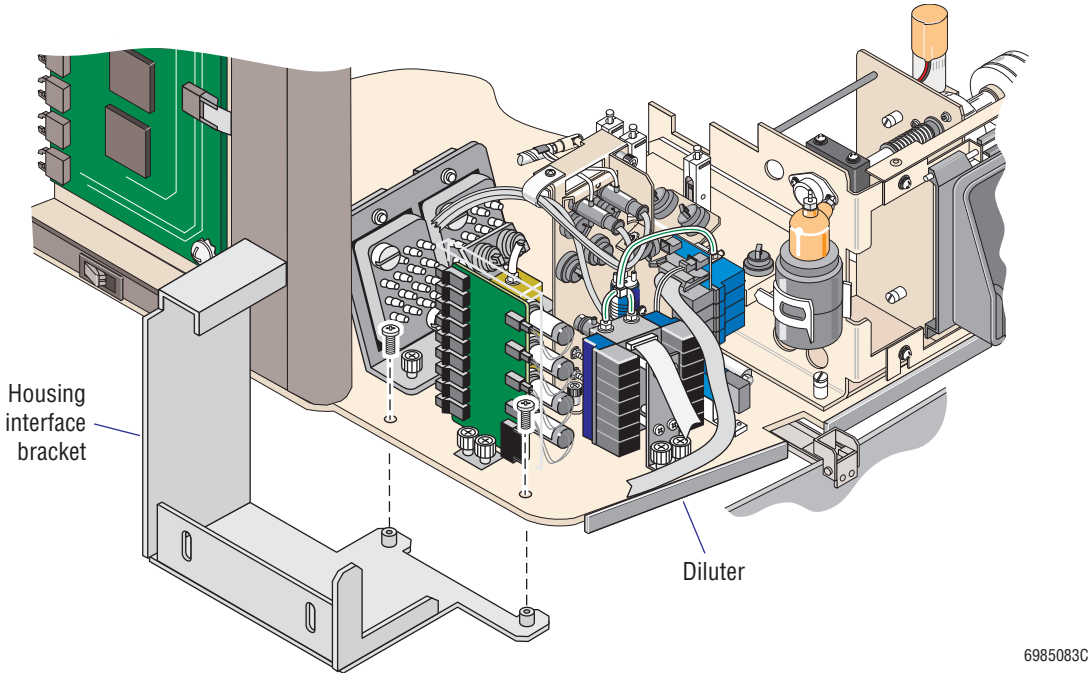


Figure 3.3-14 Connecting Tubing from VL114 to Needle Vent Fitting



6. Secure the cables of the fluid detectors to the interface bracket as shown in Figure 3.3-14.
7. Route the cable for BD3 to the Diluter 2 card and connect the cable to J9.
8. Using the hardware provided, install the housing interface bracket on the left side of the Diluter. See Figure 3.3-15.
9. Install the bridge cover on the lower front cover of the Diluter.

Figure 3.3-15 Installing the Housing Interface Bracket



Modifying the Aspiration Path - LH 750 Systems

1. Connect the tubing from the Sample Access and Reservoir module to the needle assembly area:
   a. Remove BD3 (the vent line detector) from the interface bracket. See Figure 3.3-16.
   b. Remove and discard the tubing from the top fitting on the needle to the straight leg of the Y-fitting, FY71. See Figure 3.3-16.
   c. Connect the 13 cm (5 in.) tubing from VL115 on the Sample Access and Reservoir module to the straight leg of the Y-fitting using 0.64 cm (0.25 in.) of yellow-striped tubing as a sleeve to secure the tubing. See Figure 3.3-17.

Figure 3.3-16 Removing Tubing from Y-Fitting

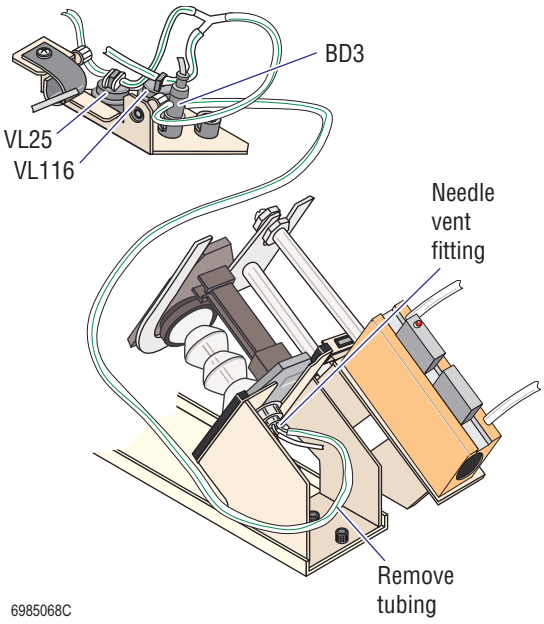
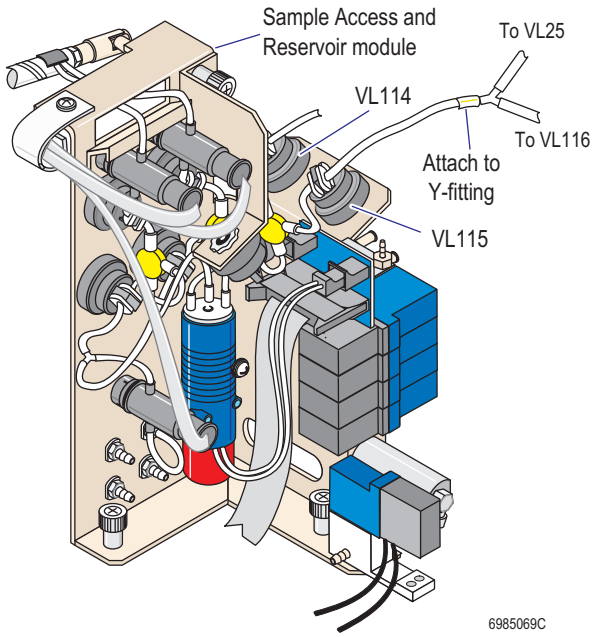


Figure 3.3-17 Connecting Tubing from VL115 to Y-Fitting



   d. Remove the fluid detector from the Integration Kit.
   e. Route the 23 cm (9 in.) tubing from VL114 on the Sample Access and Reservoir module through BD3 and then FD1, leaving about 8.9 cm (3.5 in.) of tubing extending from FD1.
   f. Install the fluid detectors on their mounts on the interface bracket.

ATTENTION: When you install a protective tubing sleeve on the needle vent port, if you do not push the sleeve completely onto the fitting it can cause the tubing to kink.

g. Connect the tubing extending from FD1 to the open vent port of the needle, using 8.3 cm (3.25 in.) of yellow-striped tubing as a protective sleeve to secure the tubing. See Figure 3.3-18. Ensure that both the tubing and its sleeve are pushed onto the needle vent port.

Note: The tubing sleeve ensures the correct distance is maintained between FD1 and the needle vent port and prevents the aspirator tubing from kinking on the needle vent port.

2. Secure the cables of the fluid detectors to the interface bracket as shown in Figure 3.3-18.
3. Route the cable for BD3 to the Diluter 2 card and connect the cable to J9.
4. Locate the end of the green/black striped tubing from VL116 that you cut when removing SOL116 to make room for the Sample Access and Reservoir module.
5. Attach the tubing from VL116 to the white, female Luer fitting in the Integration Kit, and connect the fitting to the male Luer fitting in the tubing from the Sample Access and Reservoir module, MF6, SOL116, port 6. See Figure 3.3-19.

Figure 3.3-18 Connecting Tubing from VL114 to Needle Vent Fitting

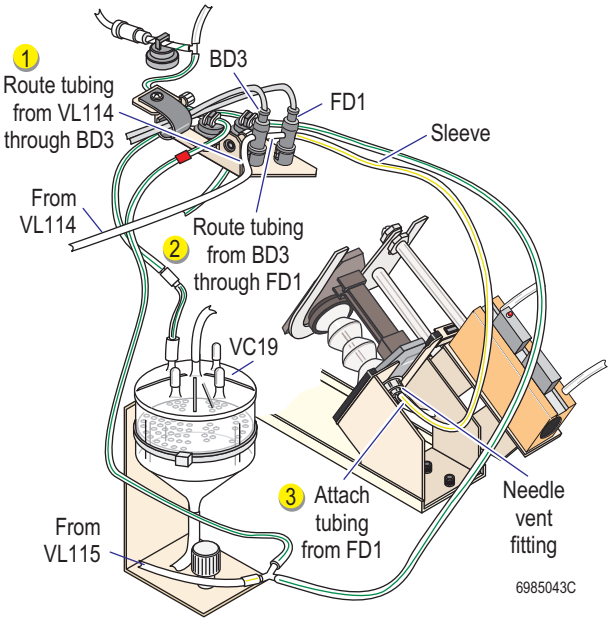
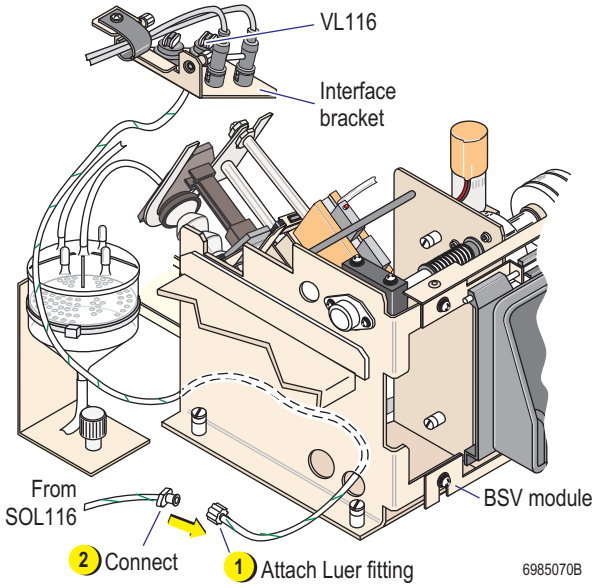


Figure 3.3-19 Connecting SOL116 to VL116



3.4 UNPACKING AND CONNECTING THE SLIDEMAKER

Tools/Supplies Needed

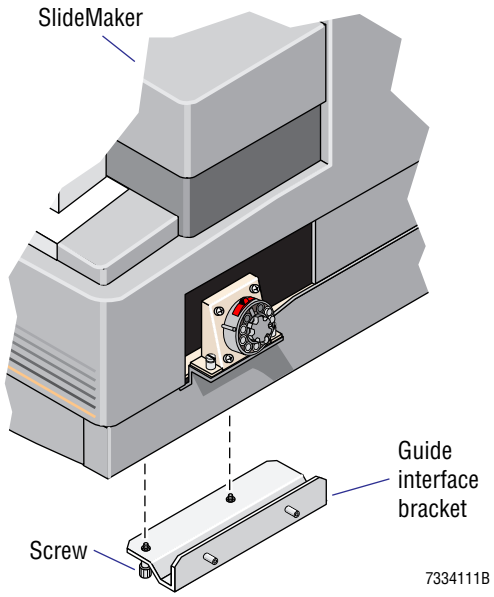
From the Integration Kit, PN 6605418 (GEN•S System) or PN 6605747 (LH 750 System), you need these components for this section.

- ❑ One guide interface bracket, PN 6806036 (GEN•S System only)
- ❑ One clamp interface bracket, PN 6806037 (GEN•S System only)
- ❑ One system interconnect cable, PN 6028728
- ❑ Level, PN 2523155
- ❑ Main Fluidics module cover, PN 1023913
- ❑ One reservoir rod assembly, PN 6806096
- ❑ Four plastic collars, PN 1023662
- ❑ Four small male plugs, PN 6232883 (for connecting diluent, cleaning agent and pneumatic input lines)
- ❑ One large male plug, PN 6232882 (for connecting for waste output line)
- ❑ Shielded diluent line, PN 6806193
- ❑ Shielded cleaning agent line, PN 6806195
- ❑ Shielded waste line, PN 6806197
- ❑ One T-fitting, 0.156 i.d. x 0.156 i.d. x 0.156 i.d., PN 6232584 (for interconnecting SlideMaker and Analytical Station waste line)
- ❑ One T-fitting, 0.156 i.d. x 0.156 i.d. x 0.156 i.d., PN 6232584 (for interconnecting SlideMaker and Analytical Station diluent lines on Analytical Stations that bypass the diluent reservoir)
- ❑ 2.1 m (7 ft) of polyurethane tubing, 0.114 i.d., PN 3202039 (pressure/vacuum input lines to SlideMaker)
- ❑ Two T-fittings, 0.125 i.d., white, PN 6216354 (for interconnecting SlideMaker and Analytical Station pneumatic lines)
- ❑ One main power cable, PN 6011023
- ❑ One Sample Access Module Splash Shield Kit, PN 6807024
- ❑ One Dispense Module Splash Shield Kit, PN 6807025

Unpacking and Positioning the SlideMaker

1. Unpack the SlideMaker, making sure it is intact with no visible defective parts.
2. If you are installing a SlideMaker on the GEN•S System, install the guide interface bracket on the GEN•S SM SlideMaker as shown in Figure 3.4-1.

Figure 3.4-1 Installing the Guide Interface Bracket on the GEN•S SM SlideMaker



3. Position the SlideMaker on the left side of the Analytical Station as shown in Figure 3.4-2 (GEN•S System) or Figure 3.4-3 (LH 750 System), leaving enough space between the SlideMaker and the Diluter to connect a cable from the SlideMaker to the SlideMaker Interface card.
4. If you are installing an LH SlideMaker, remove the tie wraps that secured the SlideMaker doors during shipment:
   a. Remove the tie wrap securing the cassette access door to the basket queue door.
   b. Open the SlideMaker cover.
   c. On the underside of the cover, remove the tie wraps securing the left and right sides of the basket queue door to the SlideMaker cover.
   d. Close the SlideMaker cover and ensure both the cassette access door and the basket queue door open freely.

Figure 3.4-2 GEN•S System Main Components Layout

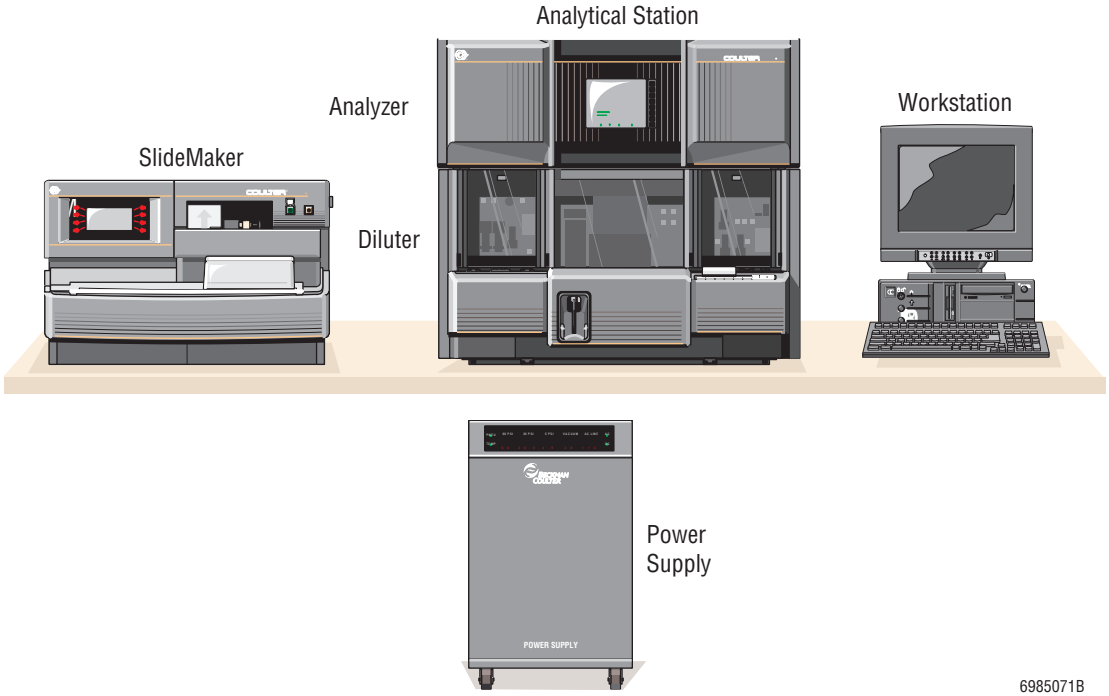
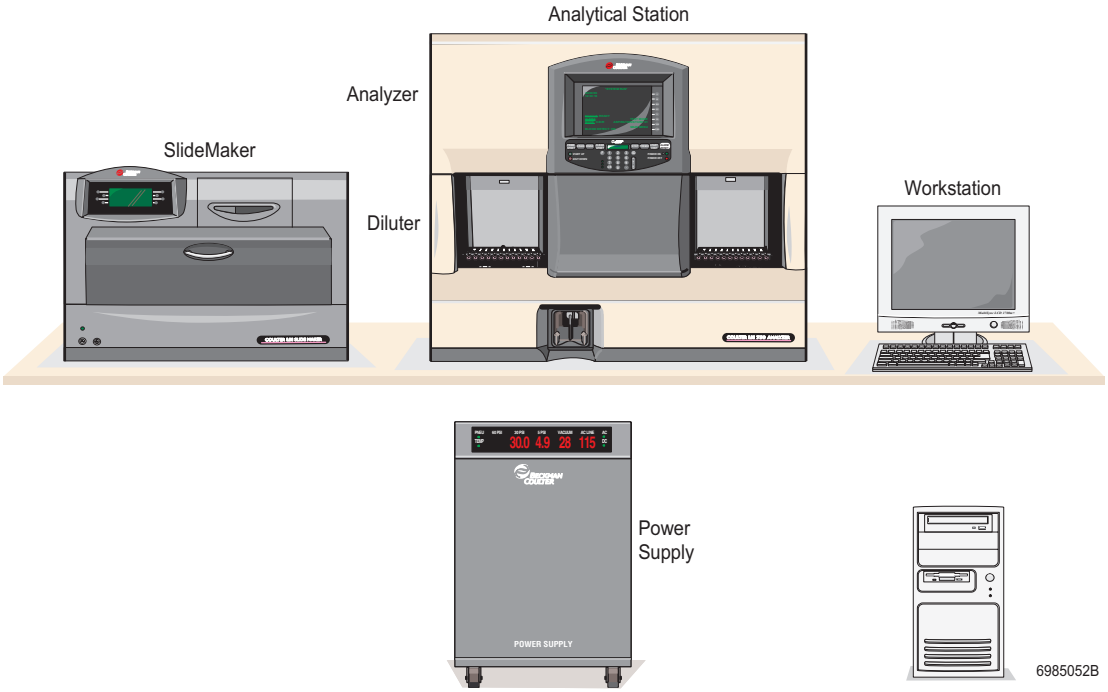


Figure 3.4-3 LH 750 System Main Components Layout



Connecting the System Interconnect Cable

1. Connect the system interconnect cable to the service port on the bottom, right rear of the SlideMaker as shown in Figure 3.4-4 (GEN•S System) or Figure 3.4-5 (LH 750 System).

   Note: Install the connector so that the cable points toward the Analytical Station.

2. Ensure the entire System is powered down.
3. Remove the cover plate on the rear corner of the Diluter.
4. Feed the other end of the system interconnect cable through the opening as shown in Figure 3.4-4 (GEN•S System) or Figure 3.4-5 (LH 750 System) and connect the cable to J2 on the Diluter 3 card.

Figure 3.4-4 Connecting the Diluter 3 SlideMaker Interface Card to GEN•S SM SlideMaker Service Port

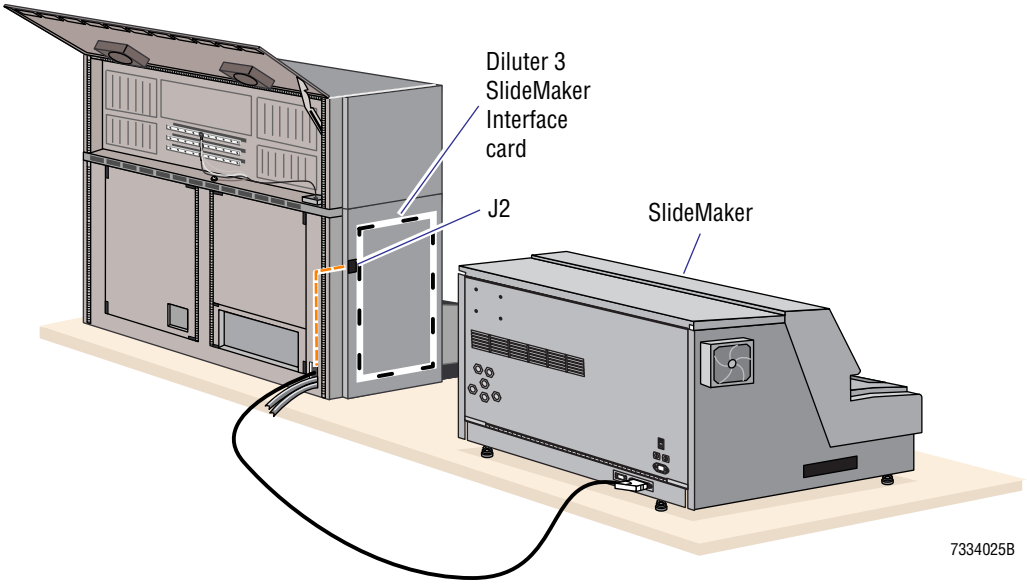
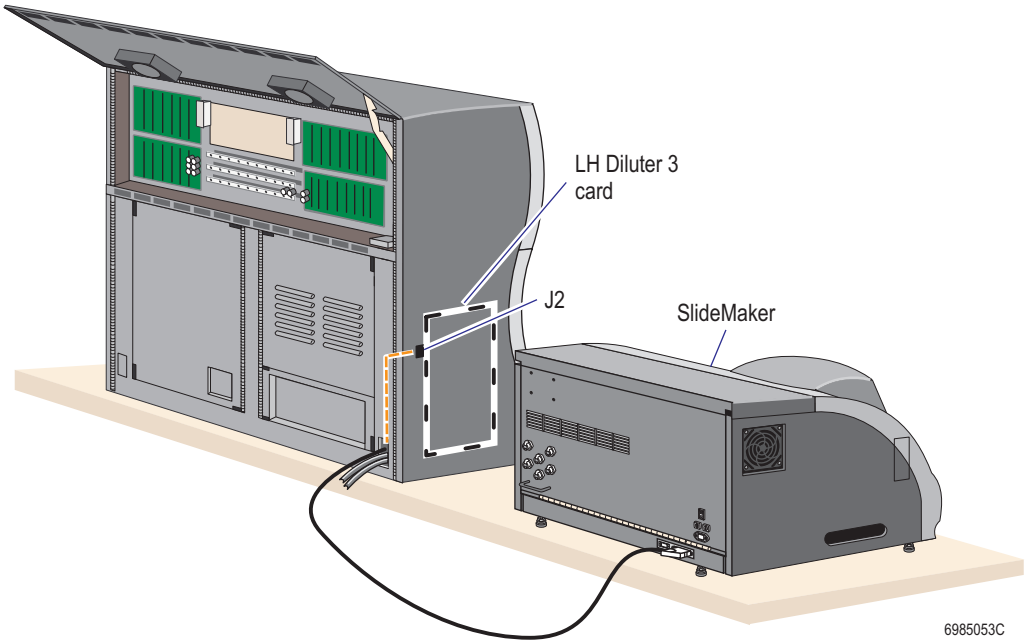


Figure 3.4-5 Connecting the LH Diluter 3 Card to LH SlideMaker Service Port



5. Connect the shield grounds for the dc power cable and IBUS cable to the screw on the cover plate at the rear of the Diluter and secure the cover plate to the rear corner of the Diluter as shown in Figure 3.4-6 (GEN•S System) or Figure 3.4-7 (LH 750 System).

Figure 3.4-6 Reinstalling the Shield Ground Wires and the Cover Plate on the GEN•S System Diluter

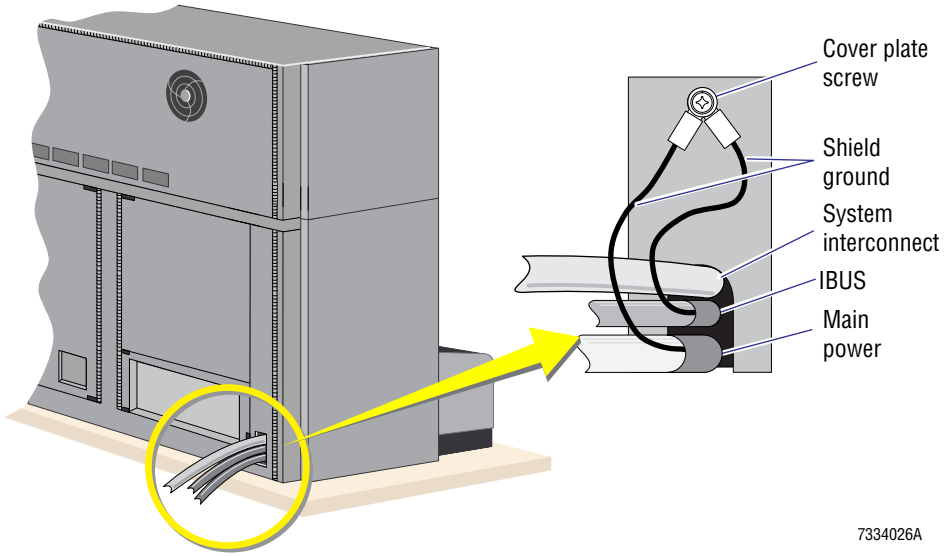
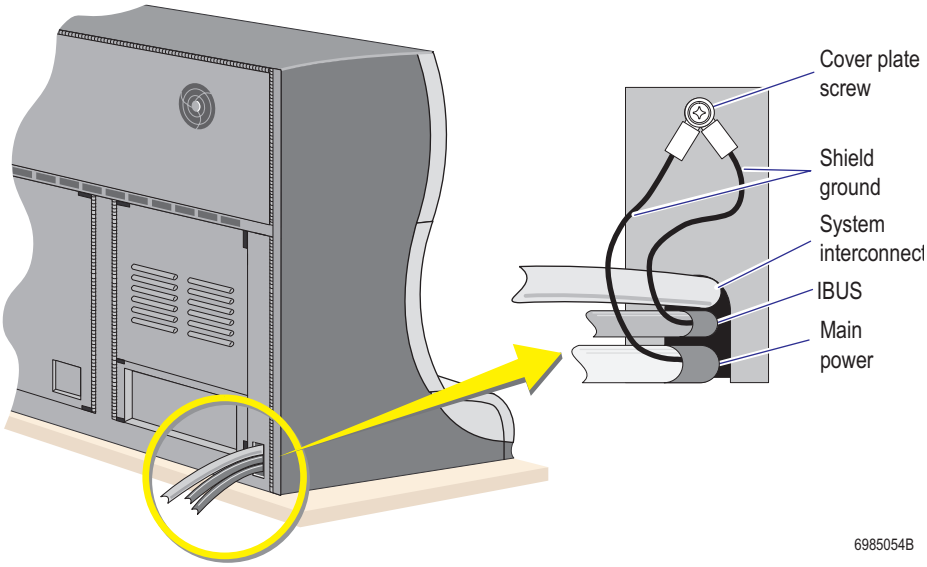


Figure 3.4-7 Reinstalling the Shield Ground Wires and the Cover Plate LH 750 System Diluter



Securing the SlideMaker to the Diluter (GEN•S System Only)

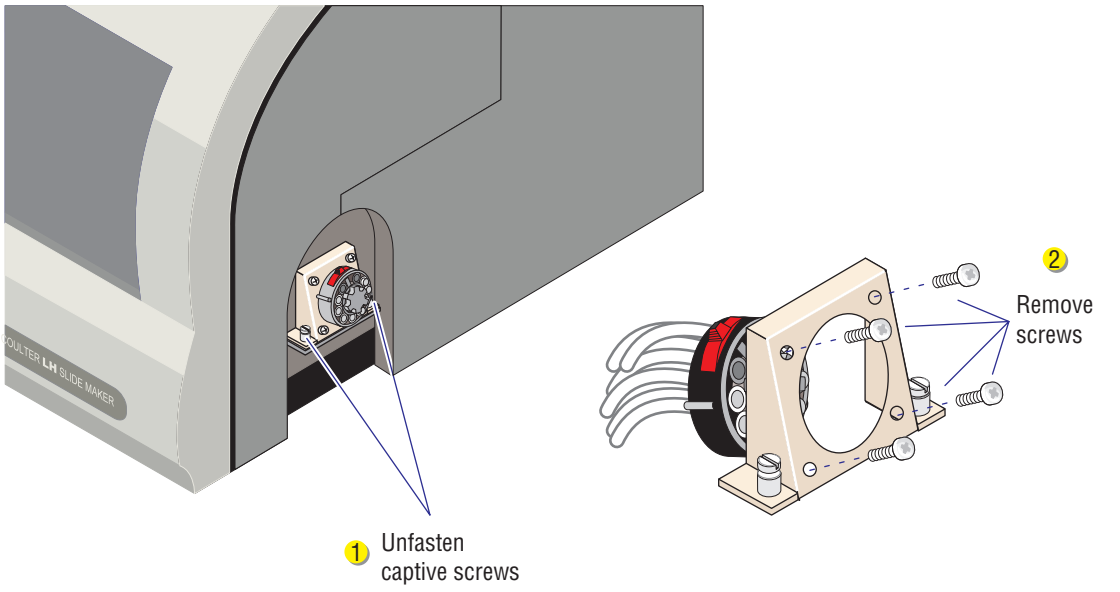
1. Align the threaded standoffs on the SlideMaker's guide interface bracket with the slots in the Diluter's housing interface bracket, and move the SlideMaker until the standoffs slip through the slots and the two brackets are flush.
2. Install the clamp interface bracket to secure the housing interface bracket to the guide interface bracket.

Removing the Quick Disconnect "Shipping" Bracket (LH 750 System Only)

Note: In the LH 750 System, the SlideMaker is not physically connected to the Diluter and the quick disconnect, QD8, is allowed to "float" freely. The bracket for QD8 is simply used as a shipping insert on the LH SlideMaker.

1. Remove the two captive screws securing the quick disconnect bracket to the right side of the SlideMaker. See Figure 3.4-8.
2. Remove the four screws on the front of the bracket and pull the quick disconnect free.

Figure 3.4-8 Removing the Quick Disconnect Bracket



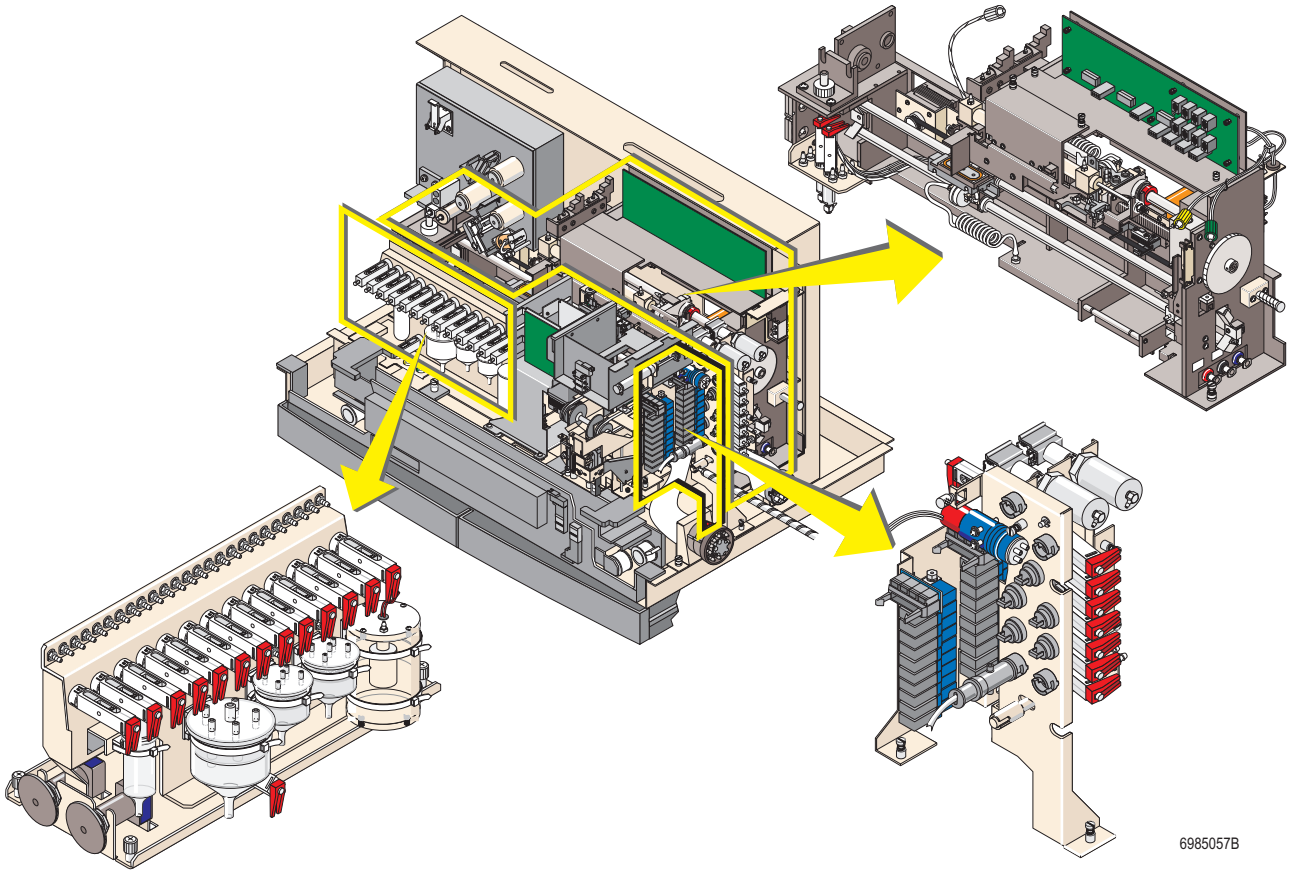
Leveling the SlideMaker

1. Place the level on the shuttle.
2. Adjust the four SlideMaker feet until the shuttle is level.

Removing the Deactivator Clips

Open the front cover of the SlideMaker and remove the red deactivator clips from the pinch valves on the Main Fluidics module, the Dispense module, and the Slide and Smear module. See Figure 3.4-9 for pinch valve locations.

Figure 3.4-9 Pinch Valve Deactivator Clip Locations



Removing Shipping Brackets from the Dispense, Main Fluidics and Slide Ejector Modules

ATTENTION: With the exception of the shipping bracket on the Slide Ejector module, all shipping brackets that must be removed are colored red.

1. At the Dispense module:
   a. Remove and discard the upper shipping bracket protruding from the Dispense module into the Cassette Output Queue.
   b. On the lower (non-red) shipping bracket securing the Dispense module to the Cassette Output Queue module, remove the screw securing the shipping bracket to the Dispense module, but do not remove the bracket.

      Note: This shipping bracket will be repositioned and used to secure the splash shield for the Dispense module.
2. At the Main Fluidics module:
   a. Remove the four screws securing the left shipping bracket (two on the bottom and two on the upper left side), and discard the shipping bracket.
   b. Remove the four screws securing the right shipping bracket (two on the bottom and two on the upper right side), and remove the right shipping bracket and the Main Fluidics module cover support bracket secured by the shipping bracket screws.
   c. Discard the right shipping bracket and reinstall the cover support bracket.

3. At the Slide Ejector module, remove the two screws securing the shipping brackets to the left side of the module and remove the brackets.

   Note: These shipping brackets cover the slot provided in the left wall of the Slide Ejector module for the input cassette transfer mechanism.

Installing the Main Fluidics Module Cover

Position the plastic cover on the Main Fluidics module, and secure the upper left side and the right top of the cover with screws.

Installing the Sample Reservoirs

1. Wrap the reservoir tubing around the reservoir support rod, if necessary:
   a. Mark both ends of the tubing before wrapping the tubing to ensure the ends will be attached to the correct fittings.
   b. Look at the progressive pitch design of the reservoir support rod to determine which end has the tighter pitch. The end with the tighter pitch belongs on the Diluter.

IMPORTANT Aspiration problems. Crossing the tubings on the reservoir support rod creates pressure on the tubings which can affect aspiration. Be careful to wrap the two tubings around the reservoir support rod without crossing one tubing over the other.

   c. Wrap the tubings parallel to each other around the reservoir support rod, leaving sufficient tubing extending on the Diluter end of the reservoir support rod (about 10 cm [4 in.]) for routing the tubing through a fluid detector and a pinch valve.
   d. Wrap tape around the end of the reservoir support rod to secure the tubings on the rod.
2. Designating the right-hand tubing as reservoir #1, connect the two reservoirs to the Diluter as shown in Figure 3.4-10.
   a. Route the Diluter end of the reservoir #1 tubing through FD2 and VL3A, and connect the tubing to FT4, using a plastic collar to secure and protect the tubing.

      Note: FT4 is connected to VL3A, VL1 and the normally open line of SOL118.
   b. Route the Diluter end of the reservoir #2 tubing through FD4 and VL4A, and connect the tubing to FT3, using a plastic collar to secure and protect the tubing.

      Note: FT3 is connected to VL4A, VL2 and the normally closed line of SOL118.
3. Connect the ball ends of the reservoir support rod to the rod support clamps on the Diluter and the SlideMaker. See Figures 3.4-10 and 3.4-11.

Figure 3.4-10 Connecting the Reservoirs to the Diluter

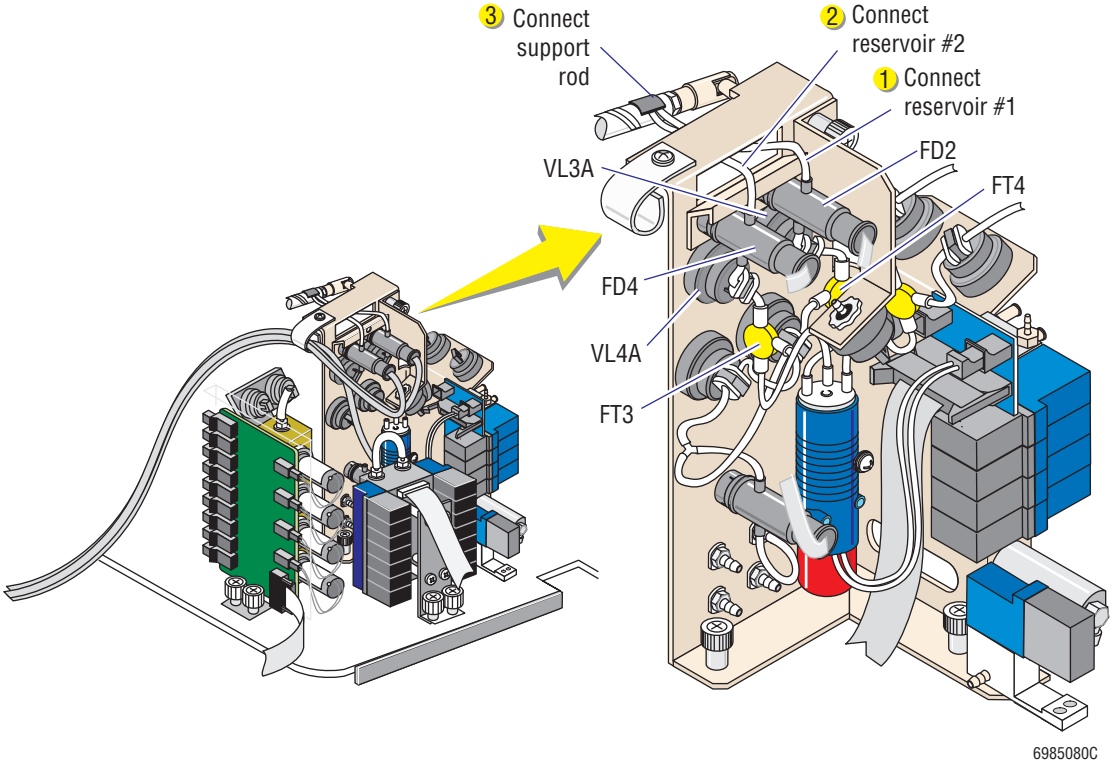
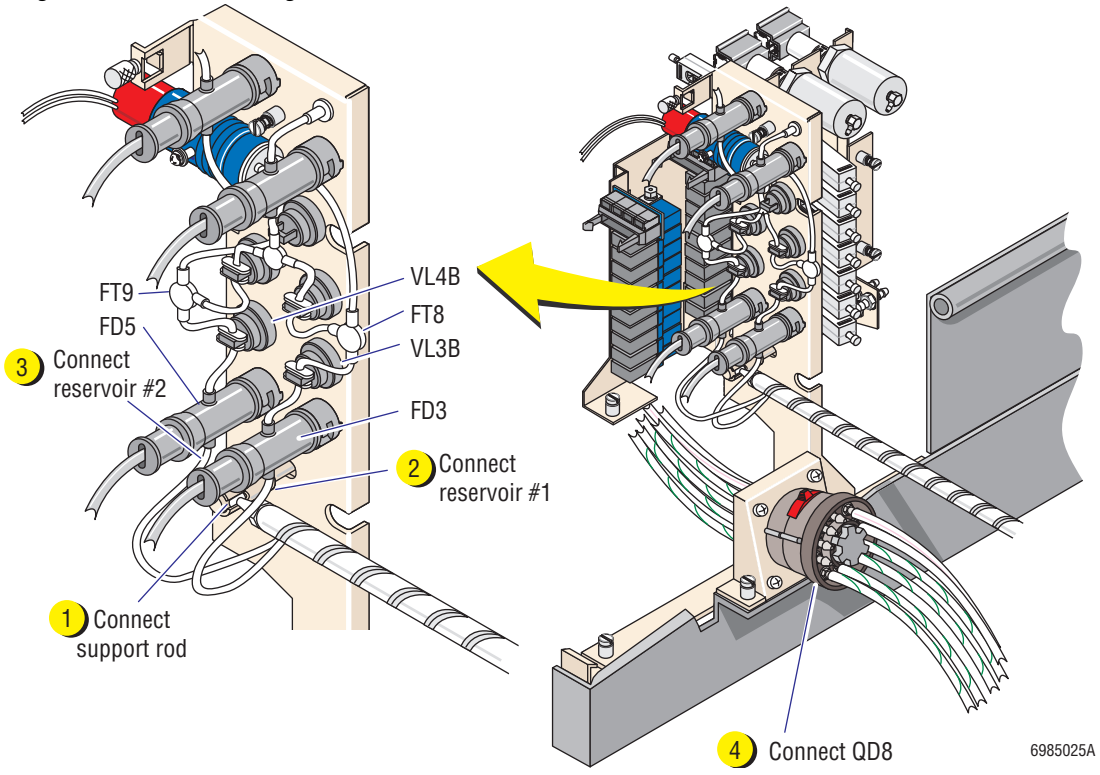


Figure 3.4-11 Connecting the Reservoirs to the SlideMaker



Note: On the LH SlideMaker, QD8 is free floating.

4. Adjust the ball fitting on the SlideMaker for the correct length, if necessary.
5. Connect the two reservoirs to the SlideMaker as shown in Figure 3.4-11.
   a. Route the SlideMaker end of the reservoir #1 tubing through FD3 and VL3B, and connect the tubing to FT8, using a plastic collar to secure and protect the tubing.

      Note: FT8 is connected to VL3B, VL6 and the normally open line of SOL24.

   b. Route the SlideMaker end of the reservoir #2 tubing through FD5 and VL4B, and connect the tubing to FT9, using a plastic collar to secure and protect the tubing.

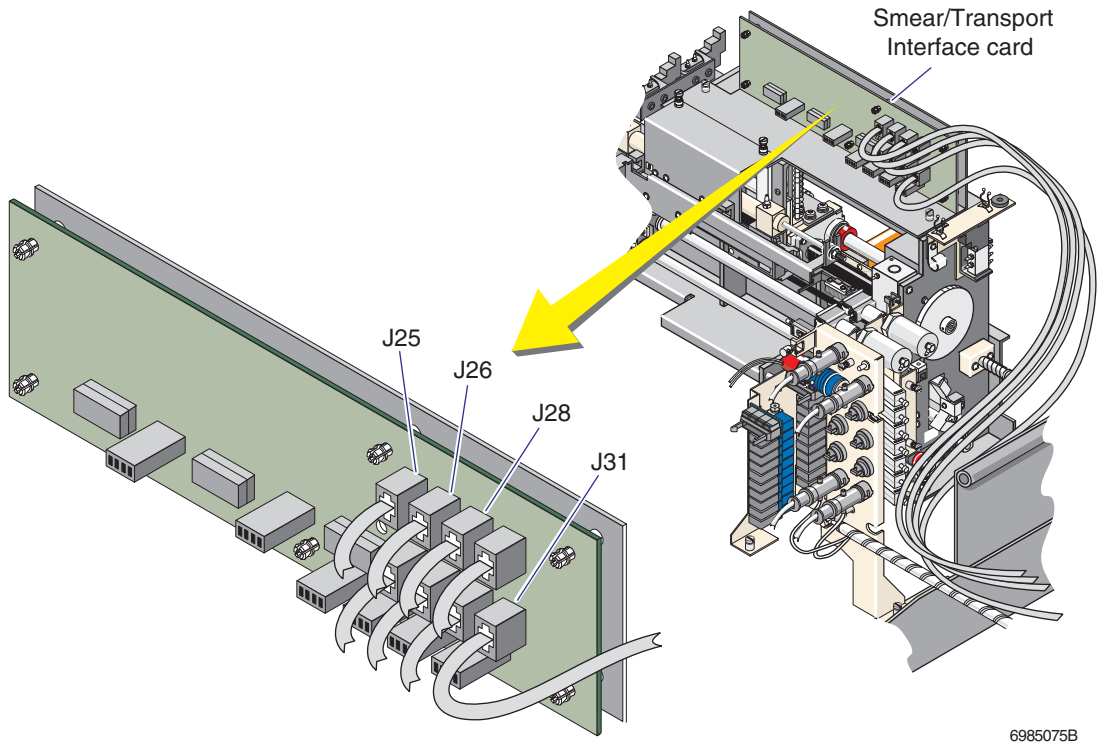
      Note: FT9 is connected to VL4B, VL7 and the normally closed line of SOL24.
6. Connect the Diluter side of QD8 connector to the SlideMaker. See Figure 3.4-11.

   Note: Remember that on the LH 750 System, QD8 is allowed to "float" freely.
7. Using Figure 3.4-12 as a guide, route the fluid detector cables from the Sample Access and Reservoir module to the Smear/Transport Interface card as follows:

Fluid detector cable for -	Connects to -
FD1	J25
FD2	J26
FD4	J28
FD7	J31

Note: For the location and function of all the connectors on the Smear/Transport Interface card, see Figure A.2-6 and Table A.2-13.

Figure 3.4-12 Routing the Fluid-Detector Cables to the Smear/Transport Interface Card



Installing the Splash Shields

1. Slide the splash shield for the Dispense module onto the module. See Figure 3.4-13.
2. Reposition the shipping bracket on the Cassette Output Queue module until the hole in the bracket aligns with the hole in the upper left side of the splash shield.
3. Secure the splash shield with two thumbscrews. See Figure 3.4-13.
4. Position the splash shield for SOL120 over the solenoid. See Figure 3.4-14.
5. Position the splash shield for the Sample Access and Reservoir module over the module, and secure it to the Diluter frame with two thumbscrews. See Figure 3.4-14.

   Note: The right thumbscrew for the Sample Access and Reservoir module's splash shield also secures the splash shield for SOL120.

Figure 3.4-13 Installing a Splash Shield on the Dispense Module

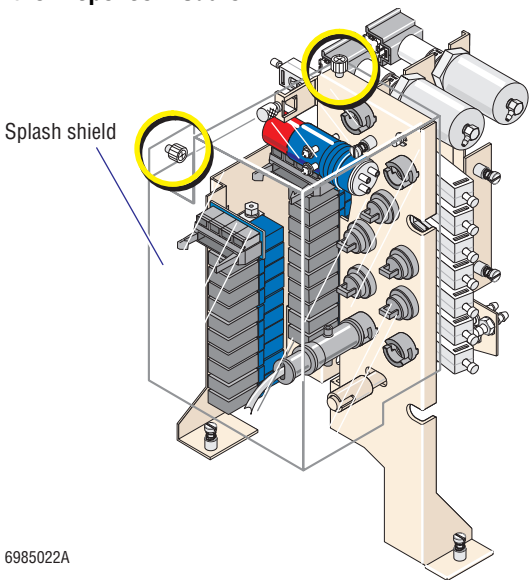
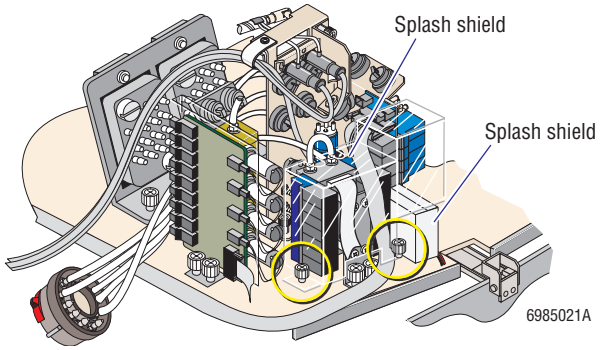


Figure 3.4-14 Installing Splash Shields on SOL120 and the Sample Access and Reservoir Module



Connecting the Hydraulic and Pneumatic Lines

1. Connect the shielded diluent, cleaning agent and waste tubing to the back of the SlideMaker and attach the ground wires to E11 as shown in Figure 3.4-15.
2. Connect the other end of the cleaning agent line to the pickup tube in the cleaning agent container.
3. Connect the other end of the diluent line according to how the Analytical Station is configured.
   - If the Analytical Station is configured to bypass the diluent reservoir, install a T-fitting in the diluent line to the Analytical Station and connect the diluent line from the SlideMaker to the T-fitting. You can insert the T fitting into the line above the diluent pickup tube as shown in Figure 3.4-16, or at the rear of the Diluter, whichever works best with the laboratory's location of the diluent container.
   - If the Analytical Station is configured to use the diluent reservoir, connect the other end of the diluent line to its pickup tube in the diluent container.

Figure 3.4-15 Connecting Fluidic Lines to the Back of the SlideMaker

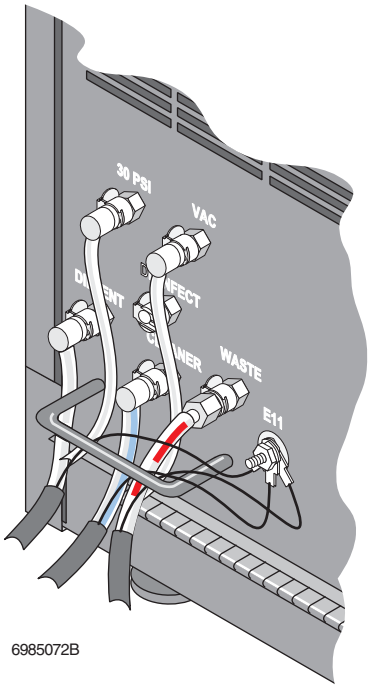
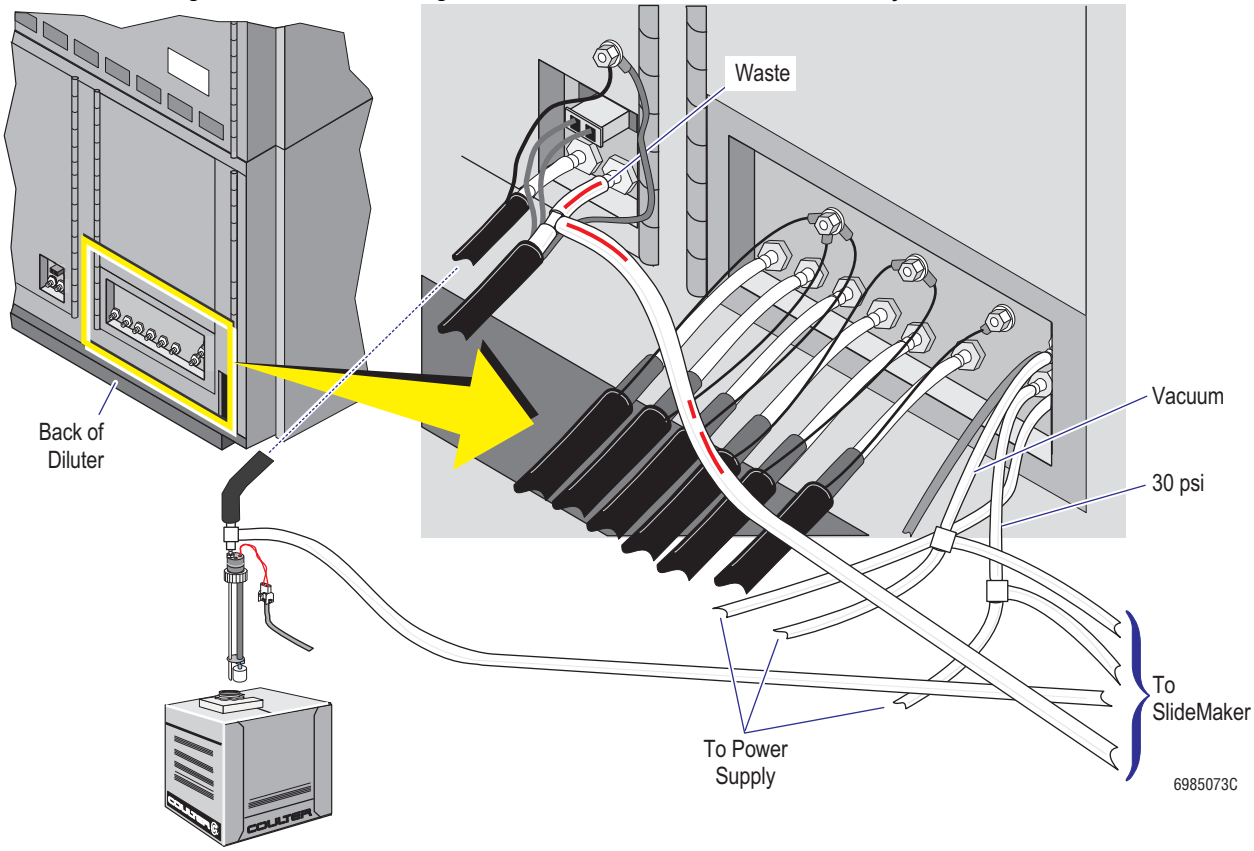


Figure 3.4-16 Connecting the SlideMaker Fluidic Lines to the Analytical Station Fluidic Lines



Note: The T-fitting in the diluent line can be inserted above the pickup tube (shown) or at the rear of the Diluter.

4. Install a T-fitting in the waste collection line at the rear of the Diluter and connect the waste tubing from the SlideMaker to the T-fitting as shown in Figure 3.4-16
5. Connect the 30 psi and vacuum tubing to the back of the SlideMaker as shown in Figure 3.4-15.
6. Install T-fittings in the 30 psi and high vacuum supply lines at the rear of the Diluter and attach the 30 psi and vacuum tubings from the SlideMaker to the T-fittings as shown in Figure 3.4-16).

Removing the Shipping Bracket from the System Control Card

ATTENTION: With the exception of the shipping bracket on the left side of the Slide Ejector module, all shipping brackets that must be removed are colored red.

1. Unfasten the four captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
2. Remove the five screws securing the shipping bracket to the front of the System Control card, and discard the shipping bracket.
3. Close the rear door and reinstall the top cover of the rear compartment.

Connecting the Main Power Cable

Connect the main power cable to the remaining port on the bottom, right rear of the SlideMaker and plug the other end of the main power cable into the ac wall outlet.

Preparing the SlideMaker for Operation

1. Load slides into a slide cassette and place the cassette in the Cassette Input Queue.
2. Place empty slide baskets in the Basket Queue module.
3. Install the label roll in the Label Printer module.
4. Install the printer ribbon in the Label Printer module.

3.5 TESTING THE SYSTEM

1. Ensure the System is powered down as instructed under Heading 4.1 in the Analytical Stations Service Manual.
2. At the Analyzer:
   a. Remove the AMC and change switch SW1, position 2, to ON (the option to use when the SlideMaker is present).
   b. Reinstall the AMC card.
   c. Remove the DILUTER PROCESSOR card (GEN•S System) or DILUTER CPU card (LH 750 System) and change switch SW1, positions 6 and 7, to ON (the options to use when the SlideMaker is present).
   d. Reinstall the DILUTER PROCESSOR or the DILUTER CPU card.
3. Power up the System and let the System reset.
4. At the Workstation:
   a. Turn on the Workstation.
   b. Log on as a Service user.
   c. Select

.
   d. Select the **Instruments** tab.
   e. In the Instrument Detail box, select **SlideMaker**.
   f. In the System Revisions box, enter the SlideMaker information and select .
   g. Select .
   h. In the Enable System Functions box, check SlideMaker and select .
5. Turn on the SlideMaker.
6. Calibrate BD3 using the F79 function on the Diluter/numeric keypad.
7. Ensure the 30 psi readout on the PNEUMATIC /POWER SUPPLIES screen is correct.
   a. On the SlideMaker screen, select **PNEUMATIC /POWER SUPPLIES** (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**).
   b. Verify the 30 psi reads 30 psi±0.5.
   c. If it does not, do Heading 4.27, 30 PSI SUPPLY CHECKS AND TRANSDUCER ADJUSTMENT.
8. Do the System Verification Procedure as instructed under Heading 5.1 in the Analytical Stations Service Manual.
9. Do the SlideMaker System Verification Procedure as instructed under Heading 5.1.
10. Complete the installation reports as directed in Report Completion under Heading 3.8 in the Analytical Stations Service Manual.

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4.1 GUIDELINES FOR SERVICING THE SLIDEMAKER

General

1. Review and heed the general safety warnings and cautions listed under Heading 1.2, SAFETY PRECAUTIONS.
2. Ensure there is adequate space to work and to access the instrument components safely. Remember that most of the modules can be removed from the SlideMaker to more easily access the components. Refer to Accessing and Removing the SlideMaker Modules in this section.
3. Before disconnecting or reconnecting the cables on any electronic components (including solenoid valves), power down (that is, turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet).

   Note: Early SlideMakers have black bodied solenoids which **WILL** damage the solenoid drivers on the System Control card if disconnected with the SlideMaker power on.
4. If using a specific procedure in this chapter, review the procedure:
   - Determine if you need any special tools, equipment or supplies. You can do most of the procedures in this chapter using the tools in a standard Service Tool Kit, a digital voltmeter, and an oscilloscope. Any special tools or equipment and any supplies needed are listed under "Tools/Supplies Needed" at the beginning of the procedure.
   - Determine if any special safety warnings or cautions apply to the procedure.
   - Check any steps listed under "Verification." If you are referenced to another procedure for verification, review that procedure also.
5. When reinstalling modules, mount the modules accurately to ensure the modules align with each other correctly.
6. When you have finished servicing the SlideMaker, always verify instrument performance by doing the System Verification Procedure as directed under Heading 5.1.

Accessing the Main Compartments in the SlideMaker

- Front compartment. See the procedures for Opening the Main Cover and Closing the Main Cover below.
- Rear compartment and the rear door. Unfasten the four captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
- Side compartments. Open the main cover, then firmly grasp the side door at the top and pull the door down.

Opening the Main Cover

Figure 4.1-1 Opening GEN•S SM SlideMaker Cover

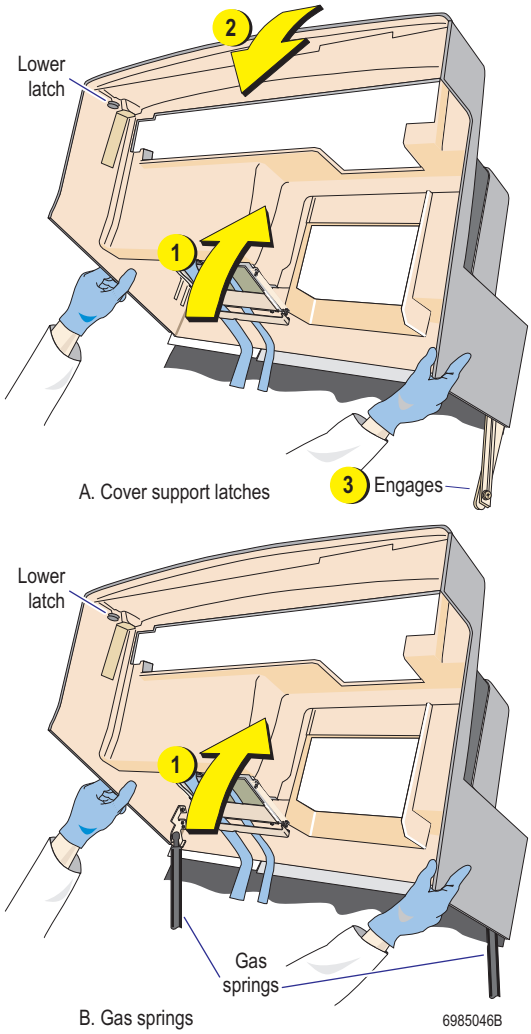
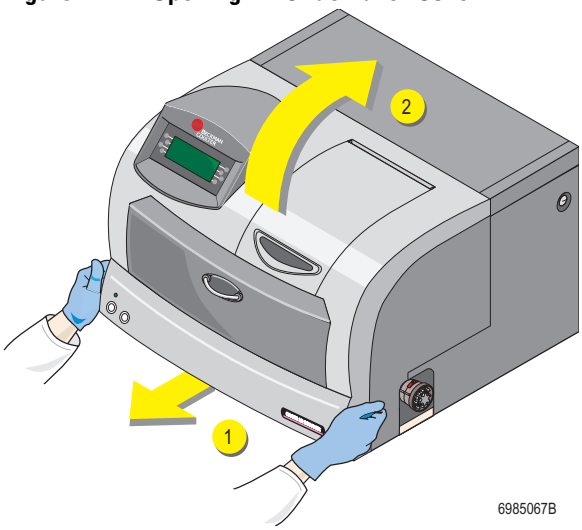


Figure 4.1-2 Opening LH SlideMaker Cover



Opening the GEN•S SM SlideMaker Cover

1. If the cover has cover support latches as shown in Figure 4.1-1A:
   a. Using both hands, raise the cover to release the lower latches.

WARNING Risk of personal injury. Injury can result if the cover support latch is not engaged securely and the cover falls. Ensure the support latch is engaged securely before releasing the cover.

   b. Push the cover all the way back and then pull it forward slightly until the cover support latch engages.
2. If the cover has gas springs as shown in Figure 4.1-1B:
   a. Using both hands, pull the bottom of the cover forward slighty to release the latches.
   b. Raise the cover completely. The gas springs hold it in place.

Note: To view the Keypad and Display module while the cover is open, pull on the latching pins securing the bottom of the Keypad and Display module to the cover and let the module swing down.

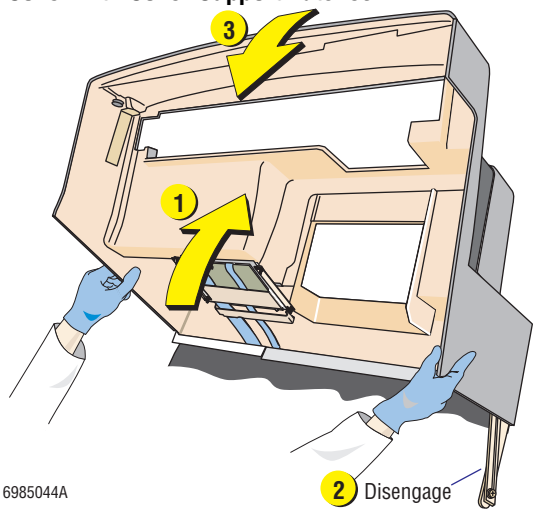
Opening the LH SlideMaker Cover

1. Using both hands, pull the bottom of the cover forward slighty to release the latches. See Figure 4.1-2.
2. Raise the cover completely. The gas springs hold it in place.

Note: To view the Keypad and Display module while the cover is open, pull on the latching pins securing the bottom of the Keypad and Display module to the cover and let the module swing down.

Closing the Main Cover

Figure 4.1-3 Closing GEN•S SM SlideMaker Cover with Cover Support Latches



Closing the GEN•S SM SlideMaker Cover with Cover Support Latches

1. Move the cover back slightly. See Figure 4.1-3.

WARNING Risk of personal injury. Injury can result if the cover falls while you are disengaging the cover support latch. Be sure to steady the cover with one hand while disengaging the support latch with the other.

2. While holding the cover with one hand, disengage the cover support latch.
3. Close the cover and ensure the lower latches are engaged.

Closing the GEN•S SM SlideMaker Cover with Gas Springs and the LH SlideMaker Cover

Grasp the cover and pull it down until it latches on the bottom.

Accessing and Removing the SlideMaker Modules

This section contains procedures for removing the:

- Basket Queue Module
- Cassette Transport Module
- Cassette Output Queue Module
- Dispense Module
- Dryer and Slide Elevator Modules
- Keypad and Display Module
- Label Printer Module
- Main Fluidics Module
- Sample Access and Reservoir Module
- Slide and Smear Module.

Basket Queue Module

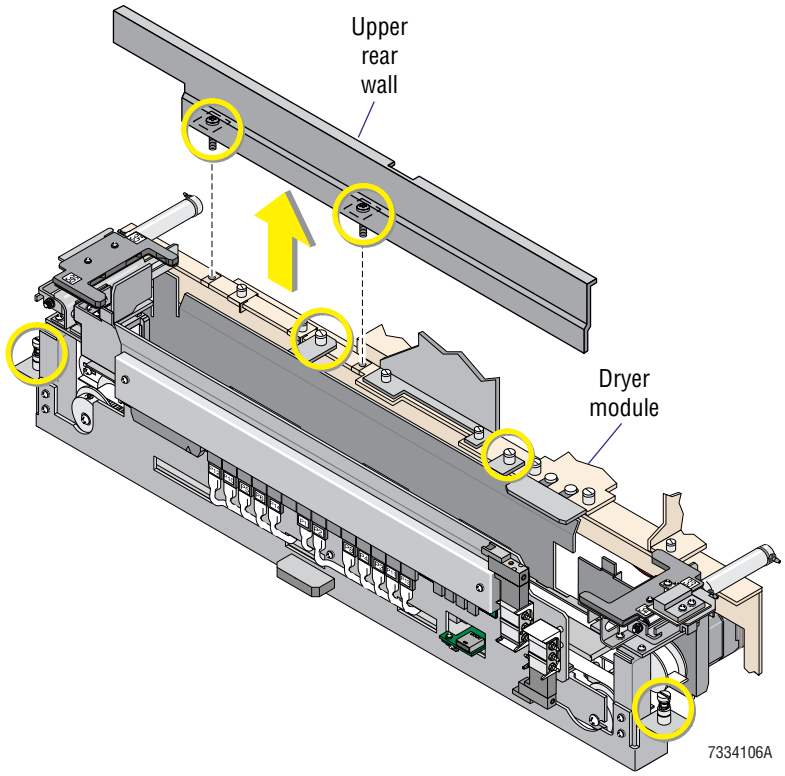
CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Unfasten the captive screws securing the upper rear wall of the Basket Queue module and remove the wall. See Figure 4.1-4.

Figure 4.1-4 Removing the Basket Queue Module



4. Unfasten the captive screws securing the Basket Queue module.
5. Disconnect the cables and tubings attached to the Basket Queue module.
6. Remove the Basket Queue module from the SlideMaker.

Cassette Transport Module

The Cassette Transport module comprises three modules: the Cassette Input Queue module, the Slide Ejector module, and the Cassette Output Queue module. While two of these three modules, the Cassette Input Queue module and the Slide Ejector module, are different functionally, they make up one physical assembly.

Use this procedure to:

- Remove the complete Cassette Transport module from the SlideMaker.
- Access components in the Cassette Input Queue and Slide Ejector modules.

To remove only the Cassette Output Queue module, see Cassette Output Queue Module.

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

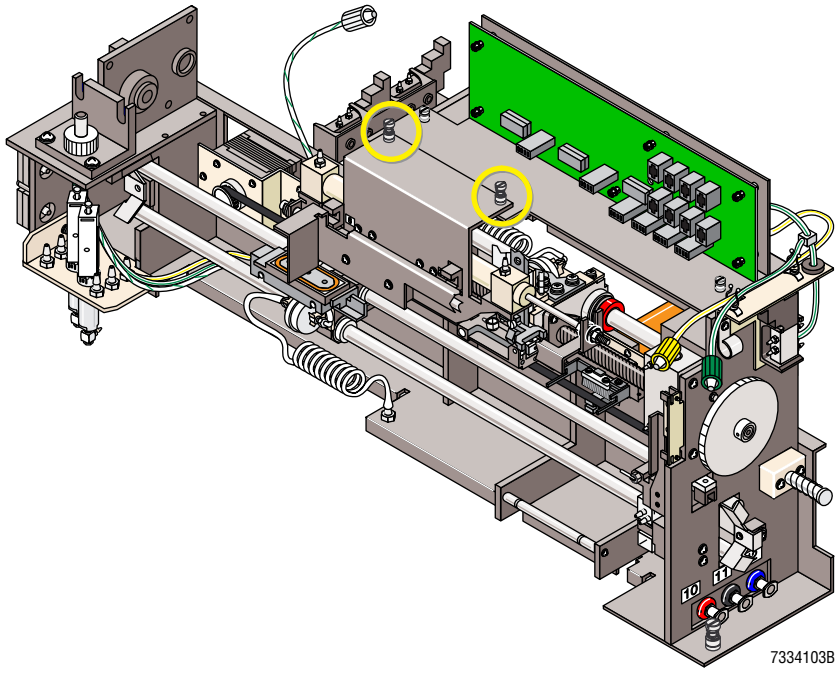
1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Unfasten the captive screws securing the upper rear wall of the Basket Queue module and remove the wall as shown in Figure 4.1-4.
4. Unfasten the captive screws securing the upper cassette transfer mechanism and set the mechanism aside. See Figure 4.1-5.

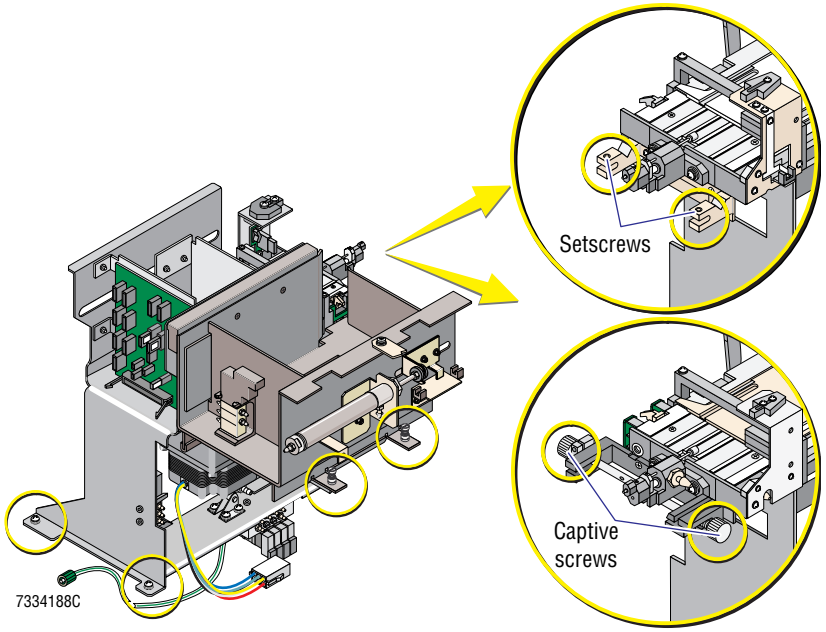
   Note: After you reinstall the upper cassette transfer mechanism, ensure the back of the slide cassette does not contact the arm of the upper cassette transfer mechanism.

Figure 4.1-5 Captive Screws Securing the Upper Cassette Transfer Mechanism



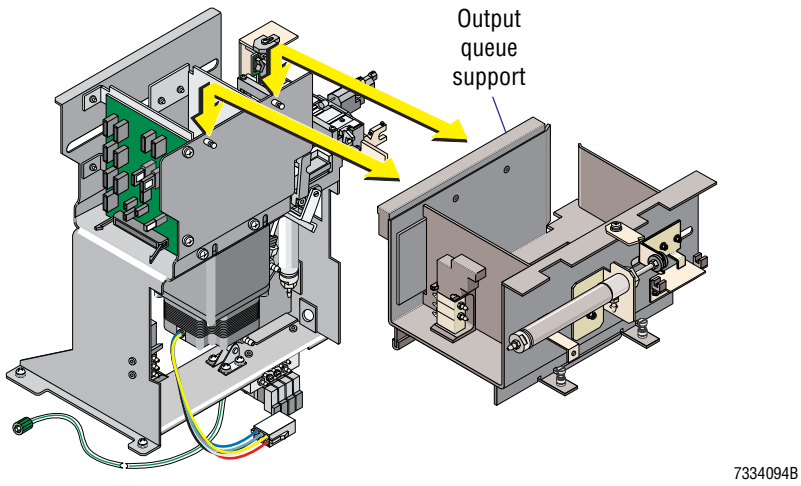
5. Depending on the configuration of the Slide Ejector module, loosen the setscrews or unfasten the captive screws securing the Slide Ejector module. See Figure 4.1-6.
6. Remove the screws securing the front of the Cassette Input Queue module and unfasten the captive screws securing the Cassette Output Queue module. See Figure 4.1-6.

Figure 4.1-6 Screws Securing the Cassette Transport Module



7. Disconnect the cables and tubings attached to the Cassette Transport module.
8. Remove the Cassette Transport module from the SlideMaker.
9. To remove the Cassette Output Queue module from the Cassette Transport module:
   a. On the output queue support (Figure 4.1-7), push back the clip securing the rear of the Cassette Output Queue module.
   b. Lift the Cassette Output Queue module up, off the pins on the right side of the Cassette Input Queue and Slide Ejector modules. See Figure 4.1-7.

Figure 4.1-7 Removing the Cassette Output Queue Module from the Cassette Transport Module



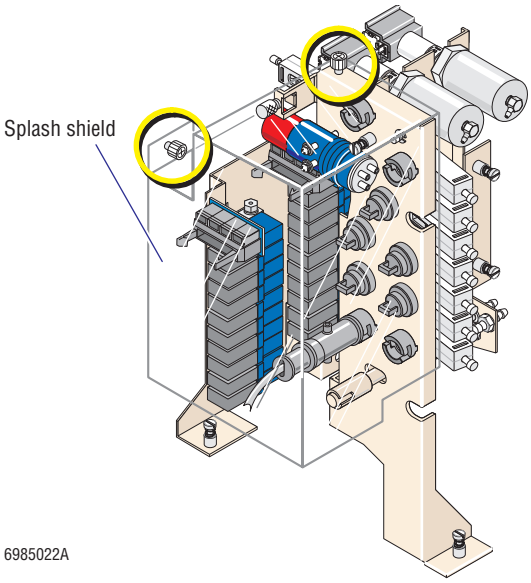
Cassette Output Queue Module

Use this procedure to remove the Cassette Output Queue module from the Cassette Transport module while the Cassette Transport module is still in the SlideMaker.

Note: For troubleshooting purposes, you can operate the SlideMaker with the Cassette Output Queue module removed from the Cassette Transport module but still connected to the SlideMaker.

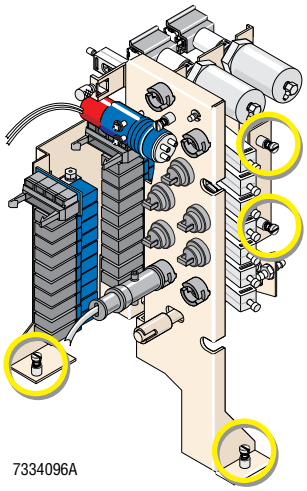
WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

Figure 4.1-8 Thumbscrews Securing the Dispense Module Splash Shield



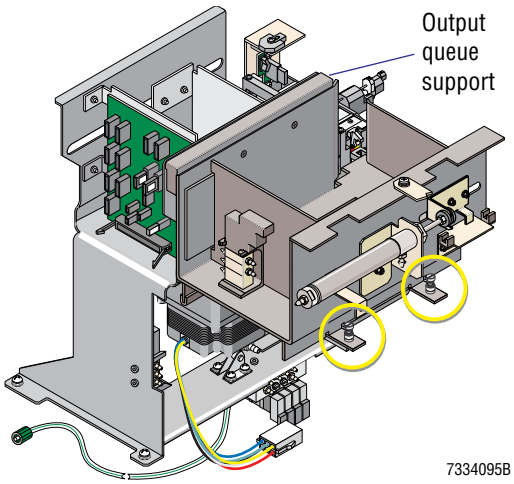
1. Open the main cover. For directions, see Opening the Main Cover in this section.
2. Remove the two thumbscrews securing the splash shield for the Dispense module, and slide off the splash shield. See Figure 4.1-8.

Figure 4.1-9 Captive Screws Securing the Dispense Module



3. Unfasten the captive screws securing the Dispense module, but do not remove the module. See Figure 4.1-9.

Figure 4.1-10 Captive Screws Securing the Cassette Output Queue Module



4. Unfasten the two captive screws securing the Cassette Output Queue module. See Figure 4.1-10.
5. On the output queue support (Figure 4.1-10), push back the clip securing the rear of the Cassette Output Queue module.
6. Move the Dispense module until the cylinder on the right side of the Cassette Output Queue module can clear the pinch valve on the Dispense module, then lift the Cassette Output Queue module up, off the pins on the left side. Refer to Figure 4.1-7.

CAUTION Instrument damage. If you operate or troubleshoot the SlideMaker with the Cassette Output Queue module removed from the Cassette Transport module but still connected to the SlideMaker, and the Cassette Output Queue module falls, the module and its associated wires and connectors can be damaged. To prevent the Cassette Output Queue module from falling, place the module in a stable location and use due care when working around it.

7. To continue operating the SlideMaker with the Cassette Output Queue module removed from the Cassette Transport module, place the Cassette Output Queue module in a stable location.
8. To completely remove the Cassette Output Queue module from the SlideMaker:

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

   a. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
   b. Disconnect the cables and tubings attached to the Cassette Output Queue module.
   c. Remove the Cassette Output Queue module from the SlideMaker.

Dispense Module

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Remove the two thumbscrews securing the splash shield for the Dispense module, and slide off the splash shield. Refer to Figure 4.1-8.
4. Unfasten the captive screws securing the Dispense module. Refer to Figure 4.1-9.
5. Disconnect the cables and tubings attached to the Dispense module.
6. Remove the Dispense module from the SlideMaker.

Dryer and Slide Elevator Modules

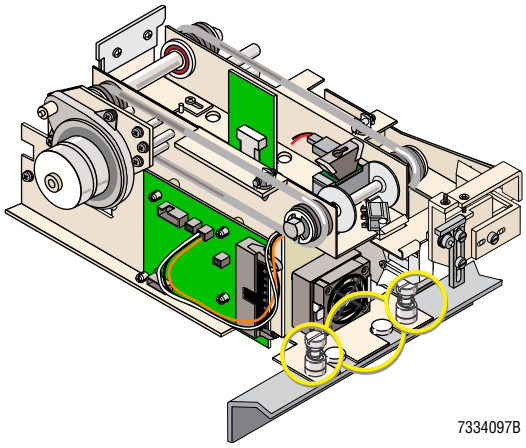
CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Remove the Cassette Output Queue module and set it aside; it is not necessary to completely disconnect the Cassette Output Queue module. Refer to the Cassette Output Queue Module removal procedure, and do steps 1 through 7.
4. Unfasten the captive screws securing the upper rear wall of the Basket Queue module and remove the wall as shown in Figure 4.1-4.
5. Unfasten the two captive screws securing the Dryer module. See Figure 4.1-11.

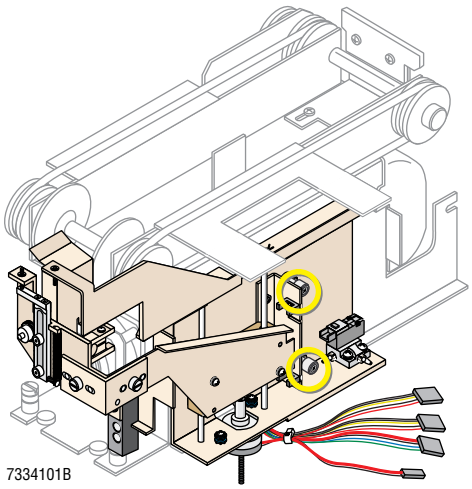
Figure 4.1-11 Captive Screws Securing the Dryer Module



6. Lift the Dryer module up, off the alignment pins mounted on the Basket Queue module. Refer to Figure 4.1-11.
7. Pull the Dryer module forward, disengaging the hooks at the back of the Dryer module from their alignment grooves.

8. Disconnect the cables and tubings attached to the Dryer and the Slide Elevator modules.
9. Remove the Dryer module from the SlideMaker.
10. To remove the Slide Elevator module from the Dryer module, unfasten the captive screws securing the Slide Elevator module to the right side of the Dryer module. See Figure 4.1-12.

Figure 4.1-12 Captive Screws Securing the Slide Elevator Module to the Dryer Module



Keypad and Display Module

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.
3. Pull on the latching pins securing the bottom of the Keypad and Display module to the cover.
4. Remove the Phillips-head screws securing the Keypad and Display module bracket to the cover.
5. Disconnect the cables attached to the Keypad and Display module, and remove the Keypad and Display module from the SlideMaker.

Label Printer Module

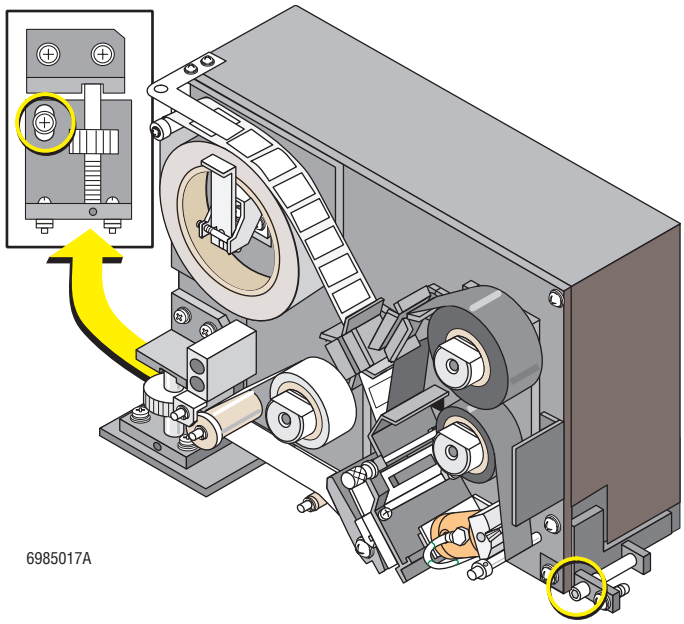
CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Remove the screws securing the Label Printer module to the Slide and Smear module. See Figure 4.1-13.

Figure 4.1-13 Screws Securing the Label Printer Module



4. Disconnect the cables, ground strap, and tubing attached to the Label Printer module.
5. Remove the Label Printer module from the SlideMaker.

Main Fluidics Module

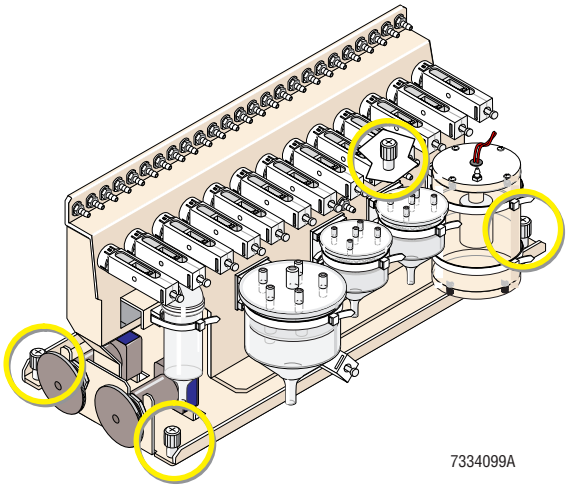
CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the electronic component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

3. Remove the two screws securing the Main Fluidics module cover, and remove the cover.
4. If shipping brackets are still installed on the Main Fluidics module, remove the four screws (two per shipping bracket) securing the shipping brackets to the main frame.
5. Unfasten the four captive screws securing the Main Fluidics module. See Figure 4.1-14.

Figure 4.1-14 Captive Screws Securing the Main Fluidics Module



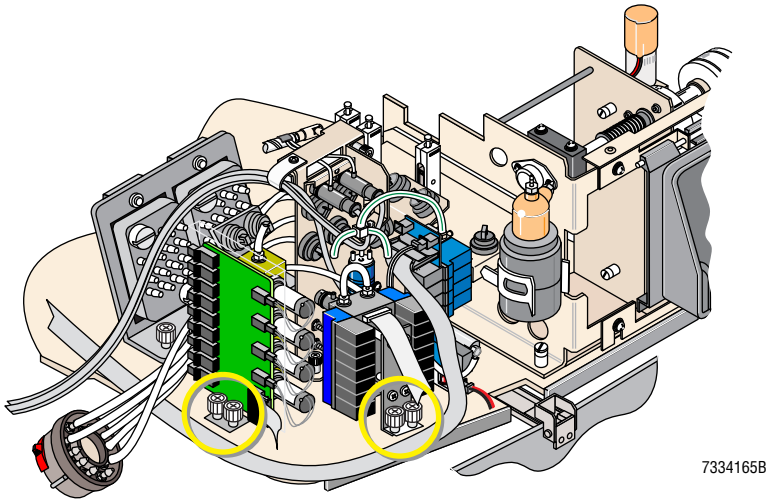
6. Disconnect the cables and tubings attached to the Main Fluidics module.
7. Remove the Main Fluidics module from the SlideMaker.
8. If shipping brackets are attached to the Main Fluidics module, remove the shipping brackets before reinstalling the module.

Sample Access and Reservoir Module

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the Analytical Station before connecting or disconnecting an electronic component.

1. Power down the Analytical Station. Refer to Heading 4.1, Power Up/Power Down, in the Analytical Stations service manual.
2. Open the lower front cover of the Diluter.
3. Unfasten the captive screws for MF4 and MF13 and move MF4 and MF13 as needed to access the Sample Access and Reservoir module. See Figure 4.1-15.

Figure 4.1-15 Captive Screws Securing MF4 and MF13



4. Remove the two thumbscrews securing the splash shield for the Sample Access and Reservoir module, and lift out the splash shield. See Figure 4.1-16.
5. Unfasten the captive screws securing the Sample Access and Reservoir module. See Figure 4.1-17.

Figure 4.1-16 Thumbscrews Securing the Sample Access and Reservoir Module Splash Shield

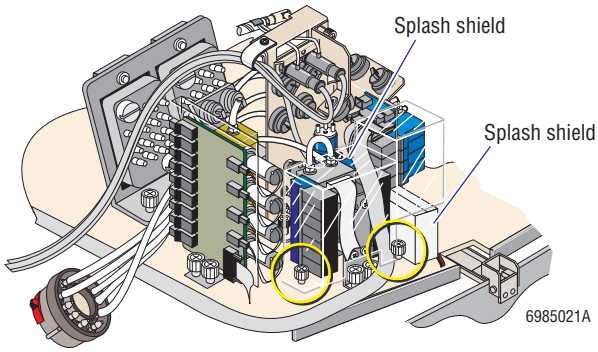
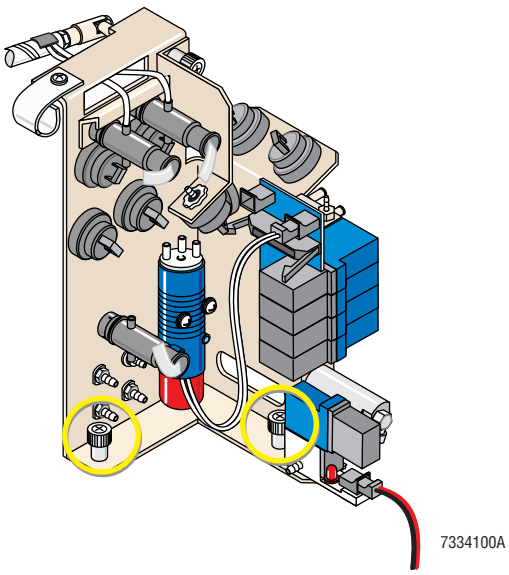


Figure 4.1-17 Captive Screws Securing the Sample Access and Reservoir Module



6. Disconnect the cables and tubings attached to the Sample Access and Reservoir module.
7. Remove the Sample Access and Reservoir module from the Diluter.

Slide and Smear Module

The Slide and Smear module comprises two modules, the Slide Transport module and the Smear module. While the Slide Transport module and the Smear module are different modules functionally, physically they make up one assembly.

CAUTION Risk of damage to electronic components. Connecting or disconnecting a circuit card, solenoid, or any other electronic component while the power is ON can damage the component or the circuitry for the component. Power down the SlideMaker before connecting or disconnecting an electronic component.

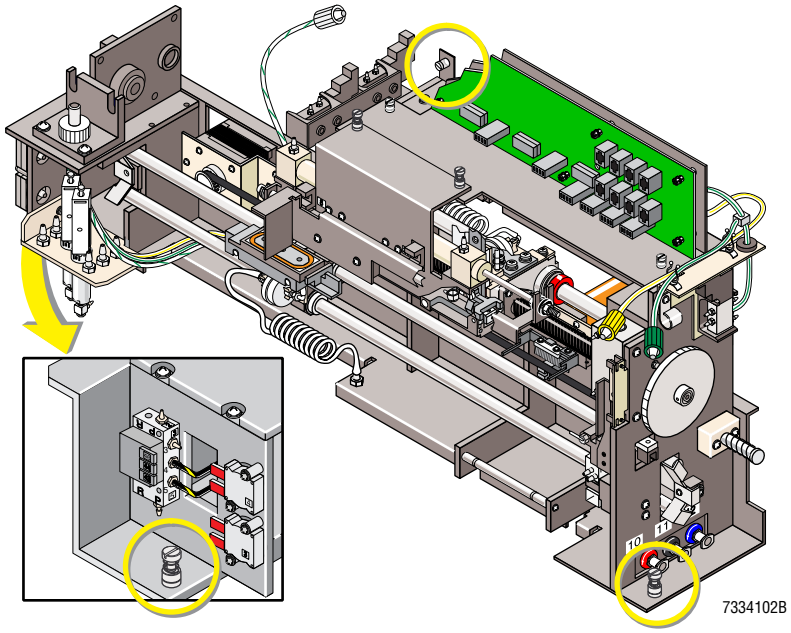
1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Open the main cover. For directions, see Opening the Main Cover in this section.
3. Remove the following modules to access the Slide and Smear Module:
   a. Dispense module. Do the Dispense Module removal procedure, beginning at step 4.
   b. Cassette Transport module. Do the Cassette Transport Module removal procedure, steps 3 through 8.
   c. Dryer module. Do the Dryer and Slide Elevator Modules removal procedure, steps 5 through 9.
   d. Main Fluidics module. Do the Main Fluidics Module removal procedure, steps 5 through 7.

WARNING Risk of personal injury and contamination. Some slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact.

4. Unfasten the captive screws securing the Slide and Smear module. See Figure 4.1-18.

   Note: The Label Printer module is mounted on the Slide and Smear module. You can remove it, if necessary, either before or after you remove the Slide and Smear module from the SlideMaker. Refer to the Label Printer Module procedure, steps 3 through 5.

Figure 4.1-18 Captive Screws Securing the Slide and Smear Module



5. Disconnect the cables and tubings attached to the Slide and Smear module.
6. Remove the Slide and Smear module from the SlideMaker.

4.2 USING THE SLIDEMAKER SERVICE FUNCTIONS

Purpose

Use this procedure to perform any of the service routines available from the SlideMaker SERVICE FUNCTIONS menu. These routines are described in the tables in this section. Refer to Figure A.5-1 for the menu tree of all the SlideMaker options, both customer and service.

Procedure

1. Log in as service.
   a. At the MAIN MENU of the SlideMaker, select **SPECIAL FUNCTIONS ▸▸ KEYPAD TEST**.
   b. Enter the current service code. Use the buttons on the left as numbers 1 through 4, top to bottom, and the buttons on the right as numbers 5 through 8, top to bottom.

   Note: Exiting the service screens automatically logs you out of the service functions.
2. At the MAIN MENU, select **SERVICE FUNCTIONS**. See Table 4.2-1 for a description of the options on the SERVICE FUNCTIONS menu.
3. Press the keys next to the relevant prompts until the required service routine appears.
4. To exit a service function, select **EXIT** as often as necessary to return to the desired screen.

Table 4.2-1 SlideMaker SERVICE FUNCTIONS Options

Options	Descriptions
CASSETTE/SHUTTLE/BASKET	Allows access to the ADVANCE CASSETTES, LOCK CASSETTE, UNLOCK CASSETTE, BASKET TEST, HOME SHUTTLE, EXERCISE SHUTTLE PATH, and DEFINE SHUTTLE REFERENCE POS. options to test the movements of the slide cassettes, the slide baskets and the shuttle. See Table 4.2-2.
SERVO SYSTEM	Allows access to the RESET SERVO SYSTEM, DEFINE SERVO OFFSETS, EXERCISE SERVO PATH, PERFORM SERVO PROFILE, and ADV SERVO TO CLEARANCE POS options. See Table 4.2-3.
PERFORM SLIDE CYCLE	Allows access to SLIDE CYCLE, SLIDE EJECT, STOP CYCLE and DRY CYCLE options. See Table 4.2-4.
RUN SERVICE	Allows access to the: • VIEW PRINTER STATUS screen which displays the current Printer status for printer hardware and software revisions, label missing, label position, label limit, total label count, print head status, temperature and temperature exceeded, motor status and speed, ribbon, stock, TOF, cold reset, and printer intensity. • PNEUMATICS/POWER SUPPLIES screen which displays the current readings for the pneumatic and electronic supplies and the acceptable tolerances. • SCAN SENSOR TEST screen which displays a list of the sensor numbers and the current state of each sensor. Use the arrow prompts to select a sensor. The name of the selected sensor is displayed on the bottom of the screen.

Table 4.2-1 SlideMaker SERVICE FUNCTIONS Options *(Continued)*

Options	Descriptions
SOLENOID TEST	Displays a list of the solenoid numbers and allows you to turn individual solenoids on and off. 1. Use the arrow prompts to move the prompt to the desired solenoid. The name of the selected solenoid is displayed on the bottom of the screen. 2. Use the **ON** and **OFF** prompts to turn the selected solenoid on or off. When a solenoid is ON, an asterisk is displayed next to the solenoid number.
MONITOR/ADJUST FLUID DETECTORS	Allows access to the FILL DILUENT, CHANNEL SELECTION, INCREASE VOLTAGE, DECREASE VOLTAGE, and DRY SYSTEM options. See Table 4.2-5.

Table 4.2-2 SlideMaker CASSETTE/SHUTTLE/BASKET Options

Options	Descriptions
ADVANCE CASSETTES	Moves the slide cassette in each station to the next slide cassette station: 1. If a slide cassette is in the slide ejection station, this function overrides the locked cassette feature and moves the slide cassette from the slide ejection station to the Cassette Output Queue module. 2. Moves a slide cassette from the Cassette Input Queue module to the slide ejection station.
LOCK CASSETTE	Locks the slide cassette in place.
UNLOCK CASSETTE	Unlocks the slide cassette.
BASKET TEST	Allows access to the FRONT BELT, REAR BELT, FRONT/REAR BELT, POSITION, ELEVATOR and STOP MOTION options to test the slide basket movements along the entire slide basket path. See Table 4.2-6.
HOME SHUTTLE	Moves the shuttle to the blood dispense position (the location of the dispense position sensor), back to the home position (the location of the smear position sensor) and then an additional number of steps past home position to ensure the entire sensing zone is blocked by the shuttle flag.
EXERCISE SHUTTLE PATH	Displays the EXERCISE SHUTTLE PATH screen with the following options: • START CYCLE - Moves the shuttle to the home position, then to the printer position, then to the blood dispense position and finally back to the home position, verifying all the motions and sensors. • STOP CYCLE - Stops the function at the end of the current cycle. • CYCLE - Switches between SINGLE and CONTINUOUS.
DEFINE SHUTTLE REFERENCE POS	Allows access to the HOME OFFSET, DISPENSE OFFSET, PRINTER OFFSET, SHUTTLE VACUUM, STEP LEFT, STEP RIGHT, and RESET SHUTTLE OFFSET options to ensure correct alignment of the shuttle with the printer, the dispense probe and the Dryer module. See Table 4.2-7.

Table 4.2-3 SlideMaker SERVO SYSTEM Options

Options	Descriptions
RESET SERVO SYSTEM	Initializes the servo controller chip; the truck proceeds to the servo reverse limit sensor, the servo forward limit sensor, and the index position.
DEFINE SERVO OFFSETS	Allows access to START PICK SEQUENCE, DEFINE PICK OFFSET, MOVE LEFT, MOVE RIGHT, START WICK SEQUENCE, DEFINE WICK OFFSET and MOVE SPEED. See Table 4.2-8.
EXERCISE SERVO PATH	Moves the truck in the Smear Transport module as follows to check the functioning of the servo path sensors: to the clearance position, then to the pick position, then to the clearance position, then to the wick position to do a slow default servo trajectory profile, and finally to the clearance position.
PERFORM SERVO PROFILE	Displays the SERVO PROFILE screen with the following options: • SERVO PROFILE - Switches between the SLOW and FAST default servo trajectory (acceleration and velocity) profiles. • RUN PROFILE -Moves the truck in the Smear Transport module to the wick position, moves the spreader slide the fixed length determined by the SERVO PROFILE selection, collects the position data during the trajectory movement and compares the data to expected position data.
ADV SERVO TO CLEARANCE POS	Moves the truck in the Smear Transport module to the absolute clearance position, a fixed default distance from the pick position.

Table 4.2-4 SlideMaker PERFORM SLIDE CYCLE Options

Options	Descriptions
SLIDE CYCLE	Switches between SINGLE and CONTINUOUS slide cycle.
SLIDE EJECT	Ejects the slide.
STOP CYCLE	Stops the selected slide cycle at the end of its sequence.
DRY CYCLE	Performs a complete slide preparation sequence without putting a drop of blood on the slide. The Dry cycle can be divided into four processes: 1. Slide pickup. 2. Smear making. 3. Slide ejection. 4. Slide placement. For a summary of these processes, refer to the Dry Cycle Sequence Summary at the end of this section. For more details, refer to Slide Ejector Module under Heading 2.6, SMEAR PROCESSING SYSTEM: CASSETTE TRANSPORT MODULE and to Slide Transport Module and Smear Module under Heading 2.7, SMEAR PROCESSING SYSTEM: SLIDE AND SMEAR MODULE.

Table 4.2-5 SlideMaker MONITOR/ADJUST FLUID DETECTORS Options

Options	Descriptions
FILL DILUENT	**CAUTION** Using the FILL DILUENT function overlong fills the vacuum overflow tank in the GEN•S System. Perform the fluid detector calibration promptly. If a delay is unavoidable, select DRY SYSTEM to drain the lines. Drains the local waste chamber drains, prepares the fluid detectors to sense diluent, delivers diluent to the SlideMaker blood lines, and displays the voltage for the fluid detector in real time.
CHANNEL SELECTION	Increments the fluid detector numbers by one until the option ALL is reached at which time it restarts at 1. **Note:** ALL is the default setting.
INCREASE VOLTAGE	Increments the voltage for the fluid detector selected by CHANNEL SELECTION. Exiting this screen saves the new voltage setting.
DECREASE VOLTAGE	Decrements the voltage for the fluid detector selected by CHANNEL SELECTION. Exiting this screen saves the new voltage setting.
DRY SYSTEM	Drains the local waste chamber drains, prepares the fluid detectors to sense air, delivers air to the SlideMaker blood lines, and displays the voltage for the fluid detector in real time.

Table 4.2-6 SlideMaker BASKET TEST Options

Options	Descriptions
FRONT BELT	Exercises the front belt in the Basket Queue module for the extent determined by the POSITION selected.
REAR BELT	Exercises the rear belt in the Basket Queue module for the extent determined by the POSITION selected.
FRONT/REAR BELT	Simultaneously exercises the front and rear belts in the Basket Queue module for the extent determined by the POSITION selected.
POSITION	Used in conjunction with FRONT BELT, REAR BELT, FRONT/REAR BELT, and ELEVATOR to determine the extent of movement. Switches between three options: • STEP - Moves one software step • CONTINUOUS - Moves continuously until operator selects STOP MOTION • SINGLE - Moves a single basket's activity.
ELEVATOR	Exercises the elevator mechanism in the Slide Elevator module for the extent determined by the POSITION selected.
STOP MOTION	Stops any continuous movement of the belts or elevator testing.

Table 4.2-7 SlideMaker DEFINE SHUTTLE REFERENCE POS Options

Options	Descriptions
HOME OFFSET XX	Moves the shuttle in the Smear Transport module to the home position (a predefined number of steps inside the smear position sensor) and displays the number of steps inside the sensor. See for the nominal setting.
DISPENSE OFFSET XX	Moves the shuttle in the Smear Transport module to the dispense position (a predefined number of steps inside the dispense position sensor) and displays the number of steps inside the sensor. See Table A.1-3 for the nominal setting.
PRINTER OFFSET XX	Moves the shuttle in the Smear Transport module to the printer position (a predefined number of steps inside the print position sensor) and displays the number of steps inside the sensor. See Table A.1-3 for the nominal setting.
SHUTTLE VACUUM	Opens [ENABLE] or closes [DISABLE] the vacuum supply line to the shuttle in the Smear Transport module.
STEP LEFT	When HOME OFFSET, DISPENSE OFFSET, or PRINTER OFFSET are selected, moves the shuttle a step to the left. Exiting this screen saves the new offset value.
STEP RIGHT	When HOME OFFSET, DISPENSE OFFSET, or PRINTER OFFSET are selected, moves the shuttle a step to the right. Exiting this screen saves the new offset value.
RESET SHUTTLE OFFSET	Returns the home, dispense and print offset values to their default values.

Table 4.2-8 SlideMaker DEFINE SERVO OFFSETS Options

Options	Descriptions
START PICK SEQUENCE	Moves the truck in the Smear Transport module to the pick position and displays the current pick offset value. Allows you to move the truck to a new pick position using the MOVE LEFT and MOVE RIGHT options.
DEFINE PICK OFFSET	Stores the new pick offset value in memory.
MOVE LEFT	When the START PICK SEQUENCE or START WICK SEQUENCE are selected, moves the truck to the left.
MOVE RIGHT	When the START PICK SEQUENCE or START WICK SEQUENCE are selected, moves the truck to the right.
START WICK SEQUENCE	Ejects a slide, moves the truck in the Smear Transport module to the pick position to retrieve the slide, and then moves the slide to the wick position and displays the current wick offset value. Allows you to move the truck to a new wick position using the MOVE LEFT and MOVE RIGHT options.
DEFINE WICK OFFSET	Stores the new wick offset value in memory.
MOVE SPEED	Determines the speed (the distance covered by the truck) each time MOVE LEFT or MOVE RIGHT is selected. The options are SLOW, MEDIUM, and FAST.

Dry Cycle Sequence Summary

A Dry cycle is the same as a slide preparation cycle except a drop of blood is not placed on the slide. At the beginning of a dry cycle, the software checks:

1. SEN20 and SEN25 to determine if a slide is on the slide pickup bridge. If not, the Slide Ejector module ejects a slide.
2. SEN4 to determine if a slide is on the shuttle. If not, the smear truck picks up a slide from the slide pickup bridge and places it on the shuttle.

Assuming both the slide pickup bridge and the shuttle have a slide, the Dry cycle sequence is as follows:

Slide Pickup Process

1. SOL49 is energized, extending the register-X cylinder, CL11. CL11 pushes down the register-X arm, clearing the path for the smear truck.
2. The smear truck moves to the pick position.
3. SOL61 and SOL56 are energized to extend CL12 which lowers the smear truck onto the slide.
4. SOL43 is energized to apply vacuum to the truck.
5. SOL48 is energized, extending the Z-button cylinder, CL3, to separate (retract) the Z-button from the slide.
6. SOL56 is de-energized and then SOL61 is de-energized to raise the smear truck and the slide from the slide pickup bridge.
7. The smear truck (with the slide) moves to the clearance position.
8. A new slide is ejected. Refer to the Slide Ejection Process below.

Smear Making Process

1. The shuttle moves to the print position where a label is applied to the smear slide.
2. While the smear truck picks up a spreader slide from the slide pickup bridge (refer to the Slide Pickup Process above), the shuttle moves to the dispense position and then back to the smear (home) position.
3. SOL61 is energized to tilt the smear truck.

   Note: Energizing SOL61 removes pressure from the bottom of CL12. Gravity tilts the smear truck down.
4. The smear truck (with the spreader slide) moves to the wick position, and then accelerates forward as though making a smear.
5. SOL61 is de-energized to retract CL12 which returns the smear truck to the horizontal position.
6. SOL44 is de-energized to remove vacuum from the shuttle.
7. SOL41 is energized to transfer the smeared slide to the Dryer module.
8. While the "smear" is being made, a new slide is ejected onto the slide pickup bridge.

Slide Ejection Process

1. SOL49 is energized, extending the register-X cylinder, CL11. CL11 pushes down the register-X arm, clearing the path for the slide.
2. The slide pusher is retracted until SEN23 is activated, allowing the bottom slide in the slide cassette to drop down, ready to be ejected.
3. The slide pusher is extended until SEN24 is activated, ejecting the bottom slide from the slide cassette onto the slide pickup bridge.
4. As the slide is ejected, it pushes the Z-button to move the flag out of SEN20.
5. SOL48 is energized, extending the Z-button cylinder, CL3, to separate (retract) the Z-button from the slide.
6. SOL49 is de-energized, retracting the register-X cylinder, CL11, which pulls up the register-X arm. The register-X arm pushes the ejected slide against the left wall of the slide pickup bridge.
7. SOL48 is de-energized, and the Z-button cylinder, CL3, retracts, extending the Z-button. The Z-button holds the slide firmly in place.

Slide Placement Process

1. The smear truck (with the slide) moves to the smear position.
2. SOL61 is energized and then SOL56 is energized to extend CL12 which lowers the smear truck onto the shuttle.
3. SOL44 is energized to apply vacuum to the shuttle.
4. SOL43 is de-energized to remove vacuum from the smear truck, releasing the slide from the smear truck.
5. SOL56 and SOL61 are de-energized to retract CL12 which raises the smear truck to its normal horizontal position.
6. If you are doing continuous Dry cycles, the process begins again.

4.3 HOME, PRINTER AND DISPENSE OFFSET SHUTTLE POSITION ADJUSTMENTS

Purpose

The home (smear), dispense and printer offsets are preset at the factory and should only need adjustment after component replacement.

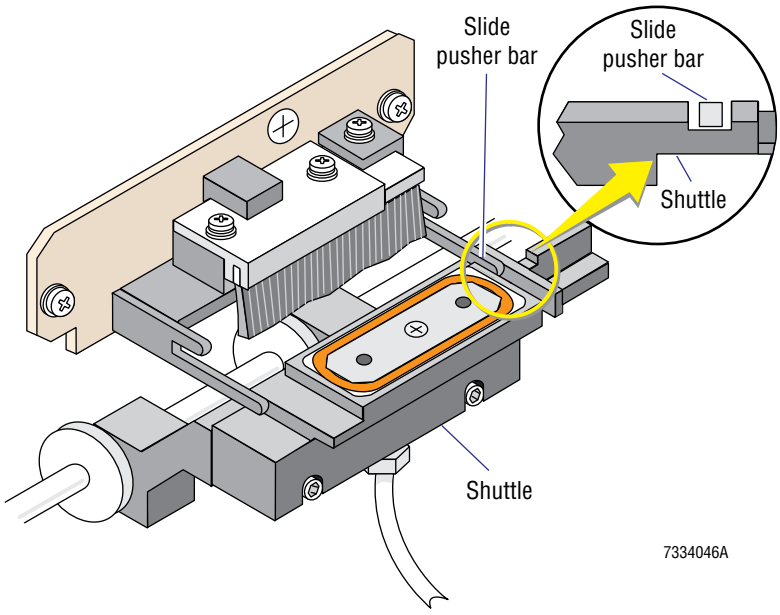
Use this procedure to verify the home, dispense and print shuttle positions are set correctly and to adjust these positions if necessary.

Setting the Home Offset

1. On the SlideMaker screen, select **HOME OFFSET** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ DEFINE SHUTTLE REFERENCE POS ▸▸ HOME OFFSET**).
2. Ensure the home offset is within the tolerance of the nominal setting specified in Table A.1-3 and the left and right sides of the slide pusher bars do not touch the shuttle as the bars pass through the shuttle. See Figure 4.3-1.

   Note: The home offset setting determines the horizontal (left to right) position of the slide pusher bars within the shuttle; the slide pusher bars adjustment (Heading 4.16, SLIDE PUSHER BARS AND SHUTTLE BRUSH ADJUSTMENTS) determines the vertical (up and down) position of the slide pusher bars within the shuttle.

Figure 4.3-1 Verifying the Home Position



3. If the home position is not correct, use the **STEP LEFT** and **STEP RIGHT** options to change the home position.
4. Ensure the home offset is within the tolerance of the nominal setting specified in Table A.1-3.

ATTENTION: The home position (smear position) is the reference position for making the smear. If you adjust the home position, you must verify the pick and wick positions are still correct.

5. If you changed the home offset, check the pick and wick positions. Go to Heading 4.4, PICK AND WICK SLIDE POSITION ADJUSTMENTS.

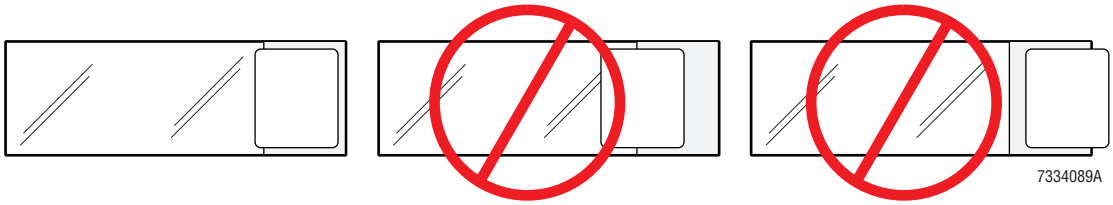
Setting the Printer Offset

Purpose

The printer offset ensures the label is positioned correctly in the X-dimension, near the right edge of the slide but not over the end. See Figure 4.3-2.

Check the print position if a laboratory changes its source of glass slides, as the length of the new slides may be different.

Figure 4.3-2 Checking the Label Positions in the X-Dimension



Procedure

ATTENTION: The pick and wick adjustments affect the placement of the slide on the shuttle and therefore can affect the location of the slide in the print position.

1. Before checking the print position, verify the pick and wick positions are correct. See Heading 4.4, PICK AND WICK SLIDE POSITION ADJUSTMENTS.

ATTENTION: The height of the Label Printer module affects the position of the labels on the slide and should be checked before adjusting the printer offset.

2. Ensure the height of the Label Printer module is correct. See Printer Height above the Slide Adjustment under Heading 4.5, PRINTER ADJUSTMENTS.
3. On the SlideMaker screen, select **DRY CYCLE (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and ensure the printer label is located on the slide as shown in Figure 4.3-2.
   - If the label is in the correct location, you do not need to adjust the printer offset. Go to Verification.
   - If the label extends into the smear area or over the end of the slide, adjust the printer offset. Go to step 4.
4. Return to the SERVICE FUNCTIONS screen.
5. Select **PRINTER OFFSET** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ DEFINE SHUTTLE REFERENCE POS ▸▸ PRINTER OFFSET**).

   Note: The shuttle moves a slide to the print position.

6. Use the **STEP LEFT** and **STEP RIGHT** options to change the shuttle position at the printer.

   Note: The higher the printer offset number the closer the label will be to the end of the slide. See Table A.1-3 for the nominal printer offset value.

7. Verify the SlideMaker is working correctly. Go to Verification.

Verification

1. Return to the SERVICE FUNCTIONS screen.
2. Select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
3. Do 12 dry cycles and ensure the label position on the slide is correct. Refer to Figure 4.3-2.

   Note: Following a printer adjustment, it normally takes four or five cycles for the changes to take affect.

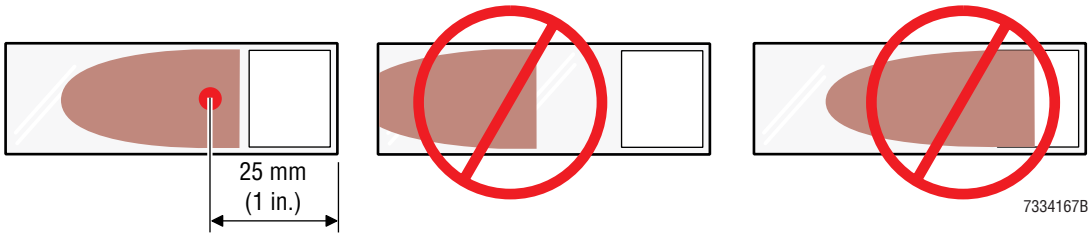
Setting the Dispense Offset

Purpose

The dispense offset ensures the blood drop is positioned correctly in the X-dimension, 25 mm (1 in.) from the right edge of the slide. See Figure 4.3-3. If the blood drop is placed too far to the left, the smear extends over the left edge of the slide. If the blood drop is placed too far to the right, the blood is pulled onto the label.

Check the dispense position if a laboratory changes its source of glass slides, as the length of the new slides may be different.

Figure 4.3-3 Checking the Smear Position on the Slide in the X-Dimension



Tools/Supplies Needed

- ❑ Felt tip marker with medium or fine point
- ❑ Ruler

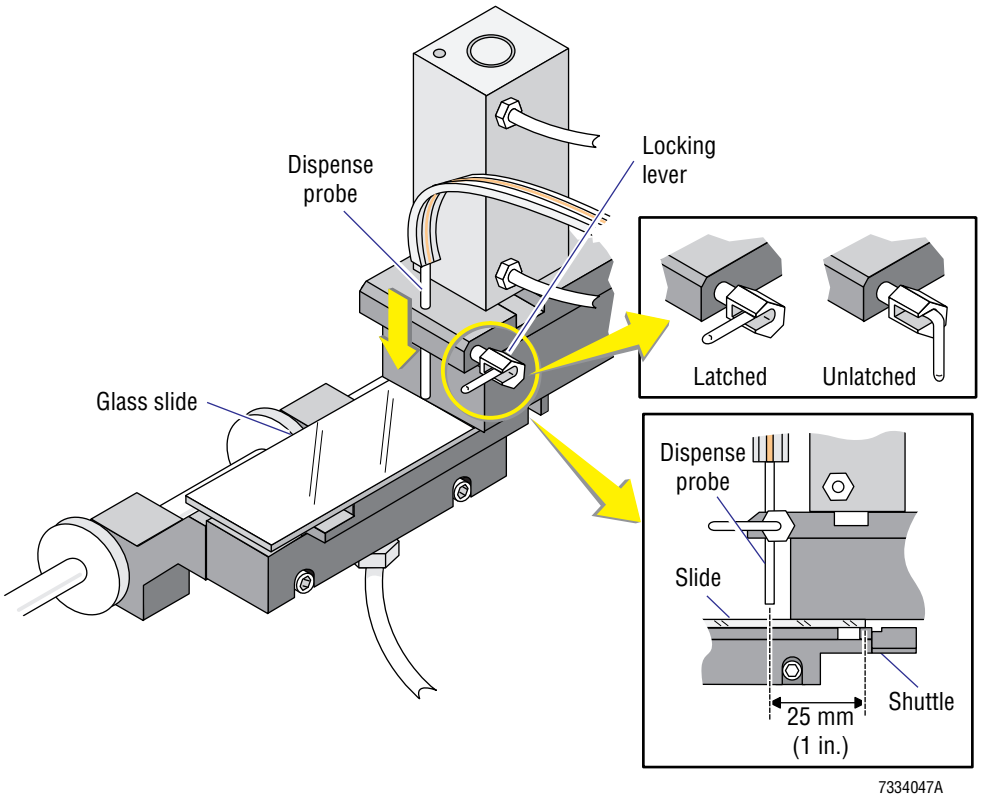
Procedure

ATTENTION: The pick and wick adjustments affect the placement of the slide on the shuttle and therefore can affect the location of the slide in the dispense position.

1. Before checking the dispense position, verify the pick and wick positions are correct. See Heading 4.4, PICK AND WICK SLIDE POSITION ADJUSTMENTS.

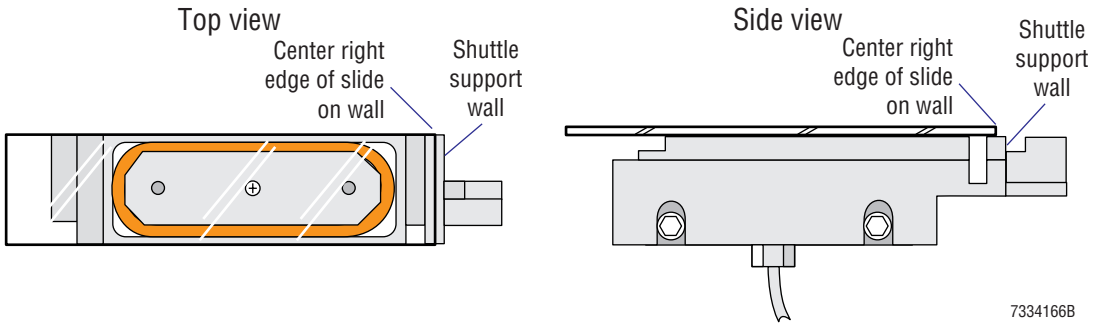
2. From the home position, exercise the shuttle all the way left and then all the way right:
   a. On the SlideMaker screen, select **HOME OFFSET** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ DEFINE SHUTTLE REFERENCE POS ▸▸ HOME OFFSET**). The shuttle moves to the home position.
   b. Select **PRINTER OFFSET**. The shuttle moves to the left to the print position.
   c. Select **DISPENSE OFFSET**. The shuttle moves to the right to the dispense position.
3. Determine the current location of the shuttle in the dispense position:
   a. Unlatch the locking lever on the dispense probe (pull the lever out and turn the lever up or down) as shown in Figure 4.3-4.
   b. Manually move the dispense probe down until it touches the slide.
   c. Using a felt tip marker, mark the position of the dispense probe on the slide.
4. Remove the marked slide from the shuttle:
   a. Latch the locking lever on the dispense probe (Figure 4.3-4), then pull the dispense probe up until the locking lever drops into the groove on the probe.
   b. Select **HOME OFFSET** to return the shuttle to the home (smear) position.
   c. Select **SHUTTLE VACUUM** to disable the vacuum.
   d. Lift the marked slide off the shuttle.

Figure 4.3-4 Verifying the Dispense Position



5. Measure the distance from the right edge of the slide to the estimated middle of the dispense probe position on the slide.
   - If the distance is 25 mm (1 in.), no adjustment is required. Re-enable the vacuum and go to Verification.
   - If the distance is not 25 mm (1 in.), adjust the dispense position. Go to step 6.
6. Adjust the shuttle dispense position:
   a. Place a clean glass slide on the shuttle, centering the right edge of the slide on the shuttle support as shown in Figure 4.3-5.

Figure 4.3-5 Correct Position of the Slide on the Shuttle



   b. Enable the shuttle vacuum.
   c. Exercise the shuttle all the way left and then all the way right:
      1) Select **PRINTER OFFSET** to move the shuttle to the left to the print position.
      2) Select **DISPENSE OFFSET** to move the shuttle to the right to the dispense position.
   d. Use the **STEP LEFT** and **STEP RIGHT** options to change the shuttle position at the dispense probe.

      Note: See Table A.1-3 for the nominal dispense offset value.
7. Repeat steps 3 through 6 until the distance from the right edge of the slide to the estimated middle of the dispense probe position on the slide is 25 mm (1 in.).
8. Go to Verification.

Verification

1. Return to the MAIN MENU screen.
2. Run blood cycles and verify the blood drop for the smear is in the correct position on each slide. Refer to Figure 4.3-3.

4.4 PICK AND WICK SLIDE POSITION ADJUSTMENTS

Purpose

Use this procedure to set the pick and wick positions of the slide any time you change the home offset. Also use this procedure to check the pick and wick positions if a laboratory changes its source of glass slides, as the length of the new slides may be different.

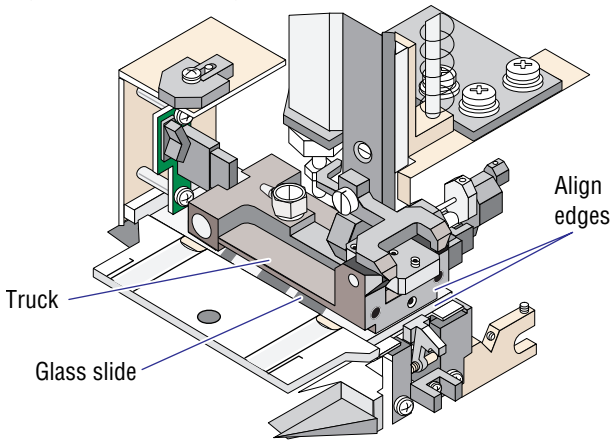
- The pick position is the location where the smear truck picks up the slide from the Slide Ejector module. Check the pick position and reset the offset value if necessary whenever you replace:
  - A servo sensor.
  - The servo motor.
  - An encoder.
- The wick position is the location where the spreader slide sits in the drop of blood on the smear slide until the blood is wicked across the smear slide. Check the wick position and reset the offset value if necessary whenever you replace:
  - A shuttle belt.
  - A servo sensor.
  - The servo motor.
  - An encoder.

Procedure

ATTENTION: The shuttle must be in the home position when setting the pick position.

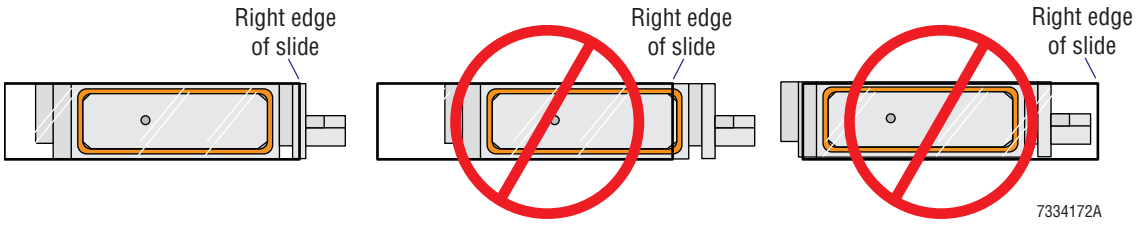
1. Reset the SlideMaker to ensure the shuttle is in the home position.
2. On the SlideMaker screen, select **SERVO SYSTEM** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SERVO SYSTEM**).
3. On the Servo System Functions screen:
   a. Select **RESET SERVO SYSTEM.**
   b. Select **DEFINE SERVO OFFSETS**.
4. Set the pick position:
   a. Select **START PICK SEQUENCE**.
   b. For better viewing, remove the slide cassette from the slide ejector station.
   c. Using the **MOVE LEFT** option and the appropriate **MOVE SPEED** (**SLOW**, **MEDIUM**, or **FAST**), move the smear truck until the right-hand edge of the truck is flush with the right end of the glass slide as shown in Figure 4.4-1.
   d. Select **DEFINE PICK OFFSET** to save the pick offset value.

Figure 4.4-1 Defining the Pick Position



5. Check the wick position:
   a. Insert a filled slide cassette into the Cassette Input Queue module.
   b. Select **START WICK SEQUENCE**. A slide is ejected, picked up by the smear truck, and moved over the slide on the shuttle.
   c. Select **DEFINE WICK OFFSET** to save the wick offset value. The slide pusher bars push the slide from the shuttle to the dryer and the smear truck places the glass slide on the shuttle.
   d. Verify that the right edge of the slide is centered on the shuttle support wall as shown in Figure 4.4-2.
      - If the slide is positioned correctly, no adjustment is needed. Go to Verification.
      - If the slide is not positioned correctly, adjust the smear truck. Go to step 6.

Figure 4.4-2 Defining the Wick Position



6. Reset the wick position:
   a. Select **START WICK SEQUENCE**.
   b. Using the **MOVE RIGHT** option and the appropriate **MOVE SPEED** (**SLOW**, **MEDIUM,** or **FAST**), move the smear truck in the correct direction to center the right edge of the slide on the shuttle support wall.
   c. Select **DEFINE WICK OFFSET** and check the position of the slide on the shuttle support wall.

d. Repeat steps a through c until the right edge of the slide is centered on the shuttle support wall as shown in Figure 4.4-2.

7. Verify the SlideMaker is working correctly. Go to Verification.

Verification

1. Return to the SERVICE FUNCTIONS menu.
2. Select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and ensure the slide is picked up from the slide ejector correctly and is moved to the correct wicking position (to the left of the label position).

ATTENTION: The pick and wick adjustments affect the placement of the slide on the shuttle and therefore can affect the location of the slide in the print and dispense positions.

3. If you reset the pick and wick positions, check the print and dispense shuttle positions. Go to Setting the Printer Offset and Setting the Dispense Offset under Heading 4.3, HOME, PRINTER AND DISPENSE OFFSET SHUTTLE POSITION ADJUSTMENTS.

4.5 PRINTER ADJUSTMENTS

Purpose

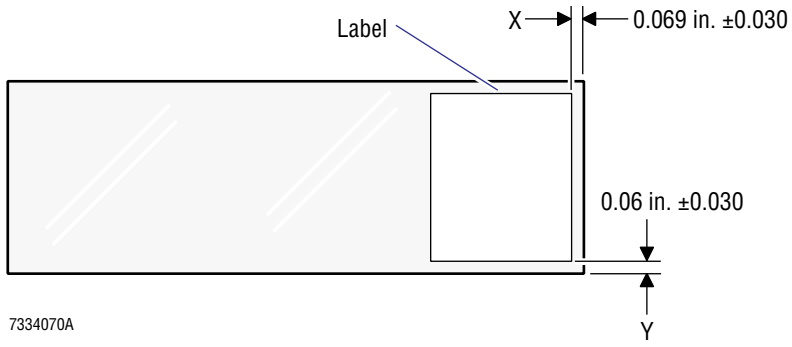
Use these procedures to:

- Increase or decrease the clearance between the slide and the label and ribbon rolls. This is accomplished by adjusting the height adjustment screw to raise or lower the Label Printer module. See Printer Height above the Slide Adjustment.

  Note: The height of the Label Printer module can affect the position of the labels on the slide.
- Move the location of the label on the slide in the Y-dimension. See Figure 4.5-1. This is accomplished by adjusting the Y-adjustment screw. See Label Position in the Y-Dimension Adjustment

To move the location of the label on the slide in the X-dimension, as shown in Figure 4.5-1, see Setting the Printer Offset under Heading 4.3.

Figure 4.5-1 Correct Position of the Label on the Slide



Printer Height above the Slide Adjustment

Tools/Supplies Needed

❑ Glass slide

Procedure

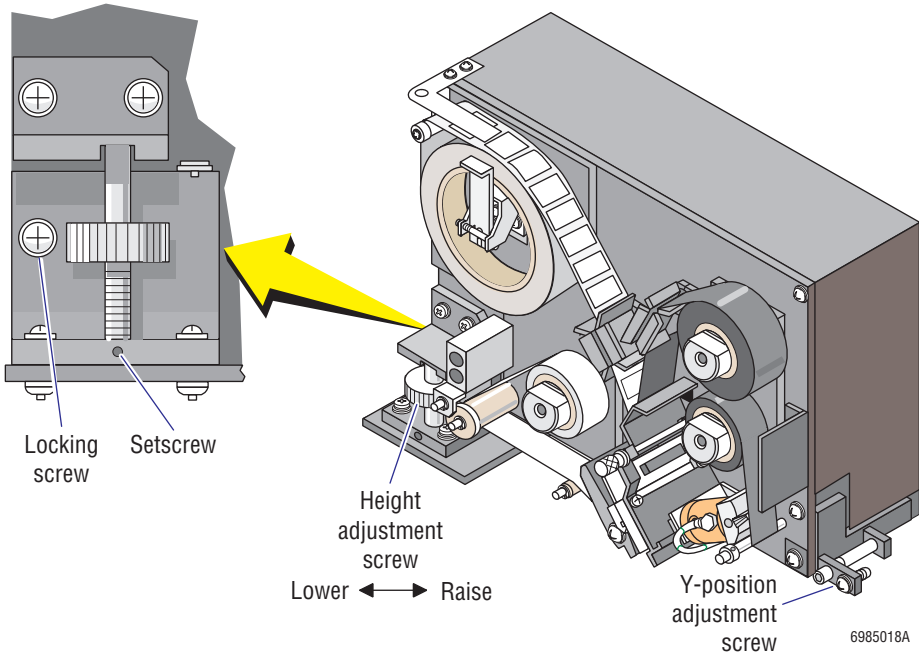
1. Place a glass slide on the shuttle and manually move the shuttle to the printer position.
2. Verify the clearance between the printhead and the slide is 1 mm (0.04 in.), the thickness of a glass slide.

   Note: The correct clearance is the thickness of one glass slide between the printhead and a slide on the shuttle or two glass slides between the printhead and the shuttle itself.
3. If the clearance is not correct, adjust the height position of the Printer module:
   a. Loosen the locking screw. See Figure 4.5-2.
   b. Loosen the setscrew for the height adjustment screw. See Figure 4.5-2.
   c. Turn the height adjustment screw in the required direction, as shown in Figure 4.5-2.

d. Tighten the setscrew for the height adjustment screw.

e. Tighten the locking screw.

Figure 4.5-2 Printer Module Adjustments



4. If you adjusted the height adjustment screw, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).

5. Do 12 dry cycles and ensure the label position on the slide is correct. See Figures 4.5-3 and 4.5-4.

   Note: Following a printer adjustment, it normally takes four or five cycles for the changes to take affect.

Figure 4.5-3 Checking the Label Position in the X-Dimension

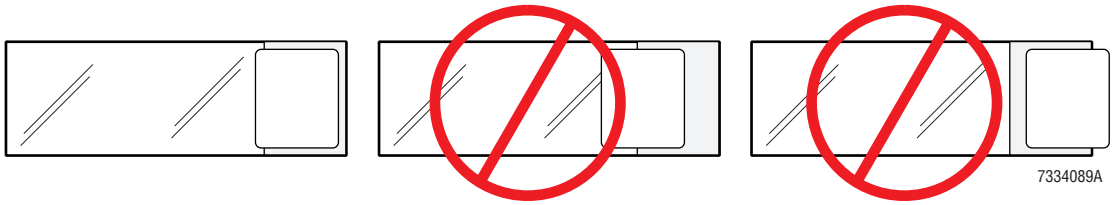
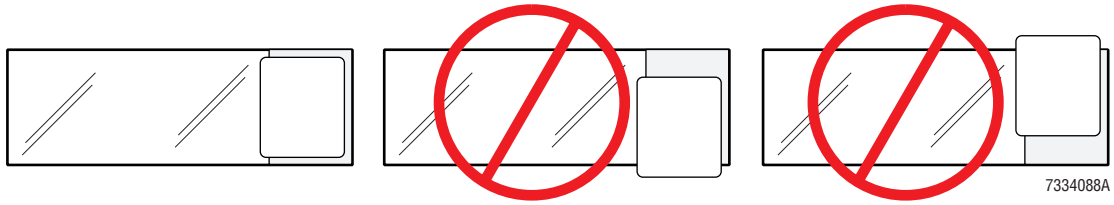


Figure 4.5-4 Checking the Label Position in the Y-Dimension



6. If the clearance between the label roll and the slide is correct, but the labels are not located in the correct position on the slides:
   - If the label is mislocated in the X-dimension, adjust the printer offset. Go to Setting the Printer Offset under Heading 4.3, and begin at step 4.
   - If the label is mislocated in the Y-dimension, adjust the Y-adjustment screw. Go to Label Position in the Y-Dimension Adjustment, and begin at step 3.

Label Position in the Y-Dimension Adjustment

ATTENTION: The height of the Label Printer module affects the position of the labels on the slide and should be checked before adjusting the Y-adjustment screw.

1. Ensure the height of the Label Printer module is correct. See Printer Height above the Slide Adjustment.
2. On the SlideMaker screen, select **DRY CYCLE (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and ensure the printer label is located correctly within the frosted area of the slide. Refer to Figures 4.5-3 and 4.5-4.
   - If the label is mislocated in the X-dimension, go to Setting the Printer Offset under Heading 4.3, and begin at step 4.
   - If the label is mislocated in the Y-dimension, go to step 3.
3. Adjust the Y-adjustment screw (Figure 4.5-2), then do 12 dry cycles to ensure correct label placement.

   Note: Following a printer adjustment, it normally takes four or five cycles for the changes to take affect.
4. Repeat step 3 until the label is positioned correctly.

4.6 SLIDE ELEVATOR PLATEN ADJUSTMENTS

Purpose

Adjust the slide elevator platen to ensure that when the platen reaches its vertical position and releases the slide, the slide is aligned with the slot in the slide basket.

Tools/Supplies Needed

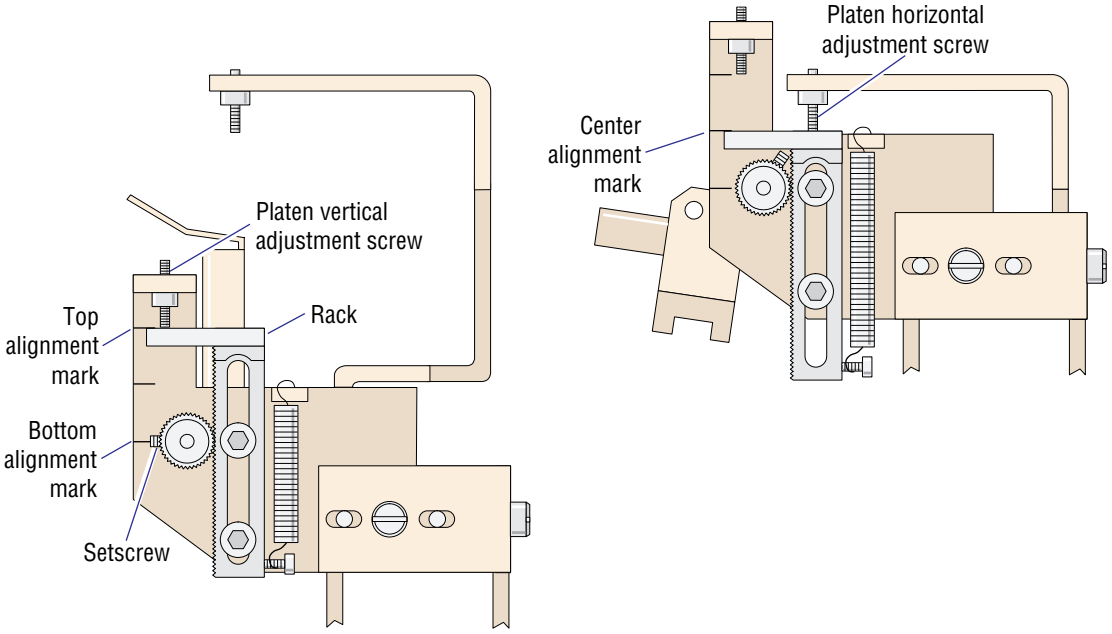
- ❑ Glass slide

Preliminary Platen Checks and Adjustments

1. On the SlideMaker screen, select **BASKET TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ BASKET TEST**).
2. Set **POSITION** to **SINGLE**.
3. Select **ELEVATOR** to move the slide elevator down.
4. While the slide elevator is moving down, select **STOP MOTION.** The slide elevator stops when it reaches the bottom limit of its travel.

   Note: If you do not select **STOP MOTION,** the slide elevator completes its downward travel and immediately begins its upward travel.
5. Check the rack and gear assembly and ensure:
   - The top of the rack is aligned with the top alignment mark. See Figure 4.6-1a.
   - The setscrew securing the gear is horizontal and aligned with the bottom alignment mark.

Figure 4.6-1 Preliminary Platen Checks and Adjustments



6. If the top of the rack is not aligned with the top alignment mark, adjust the platen vertical adjustment screw to achieve alignment. Refer to Figure 4.6-1a.
7. If the setscrew securing the gear is not horizontal and aligned with the bottom alignment mark:
   a. Remove the setscrew and the gear.
   b. Reinstall the gear in a position that aligns the hole for the setscrew with the bottom alignment mark.
   c. Reinstall the setscrew and ensure it is aligned with the bottom alignment mark.
8. Select **ELEVATOR** to move the slide elevator up.
9. While the slide elevator is moving up, select **STOP MOTION**. The slide elevator stops when it reaches the top limit of its travel.
10. Check the rack and gear assembly and ensure the top of the rack is aligned with the center alignment mark. Refer to Figure 4.6-1b.
11. If the top of the rack is not aligned with the center alignment mark, adjust the platen horizontal adjustment screw to achieve alignment. Refer to Figure 4.6-1b.

    Note: When the horizontal position of the platen is set correctly, the right side is about 10 to 15 degrees lower than the left. This tilt assures correct registration of the slide when it drops from the Dryer module onto the platen.
12. Verify the platen deposits slides in the slide baskets correctly. Go to Slide Placement Adjustments.

Slide Placement Adjustments

1. Place a glass slide on the platen.
2. Return to the SERVICE FUNCTIONS screen and select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST**).
3. De-energize SOL60 to close the gripper on the slide.
4. In the Basket Queue module, place a slide basket under the slide elevator.
5. Return to the SERVICE FUNCTIONS screen and select **BASKET TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ BASKET TEST**).
6. Set **POSITION** to **SINGLE**.
7. Select **ELEVATOR** to move the slide elevator down.
8. While the slide elevator is moving down, select **STOP MOTION**. The slide elevator stops when it reaches the bottom limit of its travel.

   Note: If you do not select **STOP MOTION**, the slide elevator completes its downward travel and immediately begins its upward travel.
9. When the slide elevator stops, check the position of the slide in the slide basket and ensure the slide is:
   a. Perpendicular to the bottom of the slide basket. If it is not, adjust the setscrew shown in Figure 4.6-2, item 1.
   b. Centered from side to side within the basket slot. If it is not, loosen the screw shown in Figure 4.6-2, item 2, and move the plate.

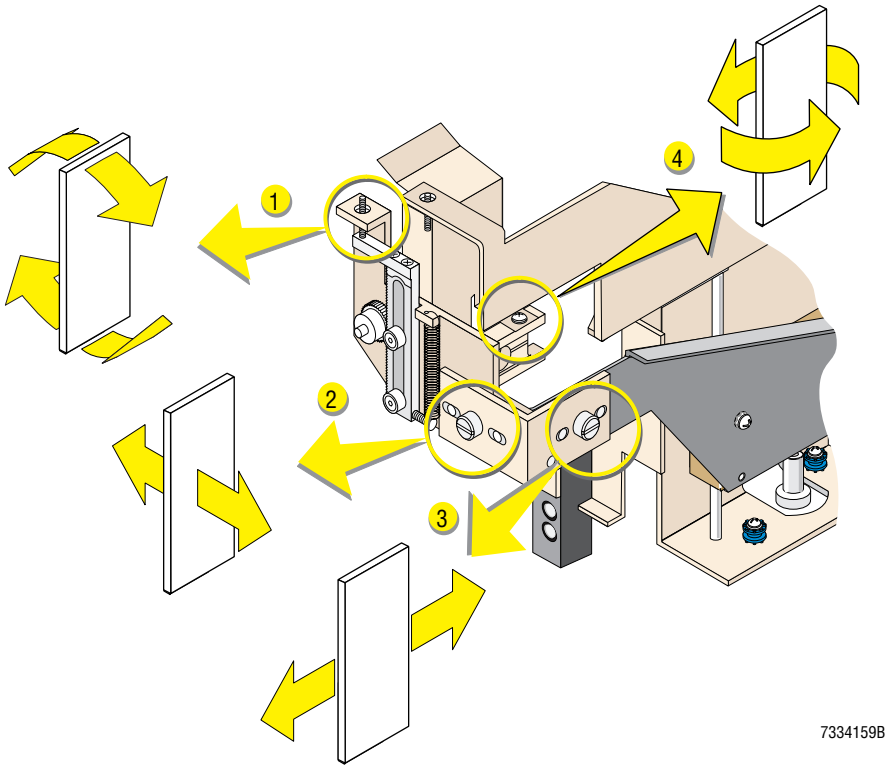
c. Centered from front to back within the basket slot. If it is not, loosen the screw shown in Figure 4.6-2, item 3, and move the bracket.

Note: Adjusting this bracket could affect the alignment of SEN46.

d. Parallel to the long sides of the basket slot. If it is not, loosen the screw shown in Figure 4.6-2, item 4, and adjust the platen.

10. Select **ELEVATOR** to move the slide elevator up.
11. While the slide elevator is moving up, select **STOP MOTION**. The slide elevator stops when it reaches the top limit of its travel and the gripper opens.
12. Remove the slide from the platen.
13. Verify SEN46 is aligned correctly. See Removal under Heading 4.26, SEN37 (BASKET INDEX SENSOR) REPLACEMENT.
14. Verify slides are deposited correctly in the slide baskets. Go to Verification.

Figure 4.6-2 Slide Elevator Platen Adjustments



Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do five dry cycles and ensure the slides are positioned correctly in the slide basket.

4.7 DISPENSE PUMP ADJUSTMENT

Purpose

The volume of blood dispensed by the dispense pumps affects the quality of the blood smears. If a dispense pump dispenses too little blood, the smears are too short; if a dispense pump dispenses too much blood, the smears are too long. The position of the barrel in the dispense pump determines the volume dispensed. Use this procedure to adjust the dispense pumps as necessary to improve smear quality.

Tools/Supplies Needed

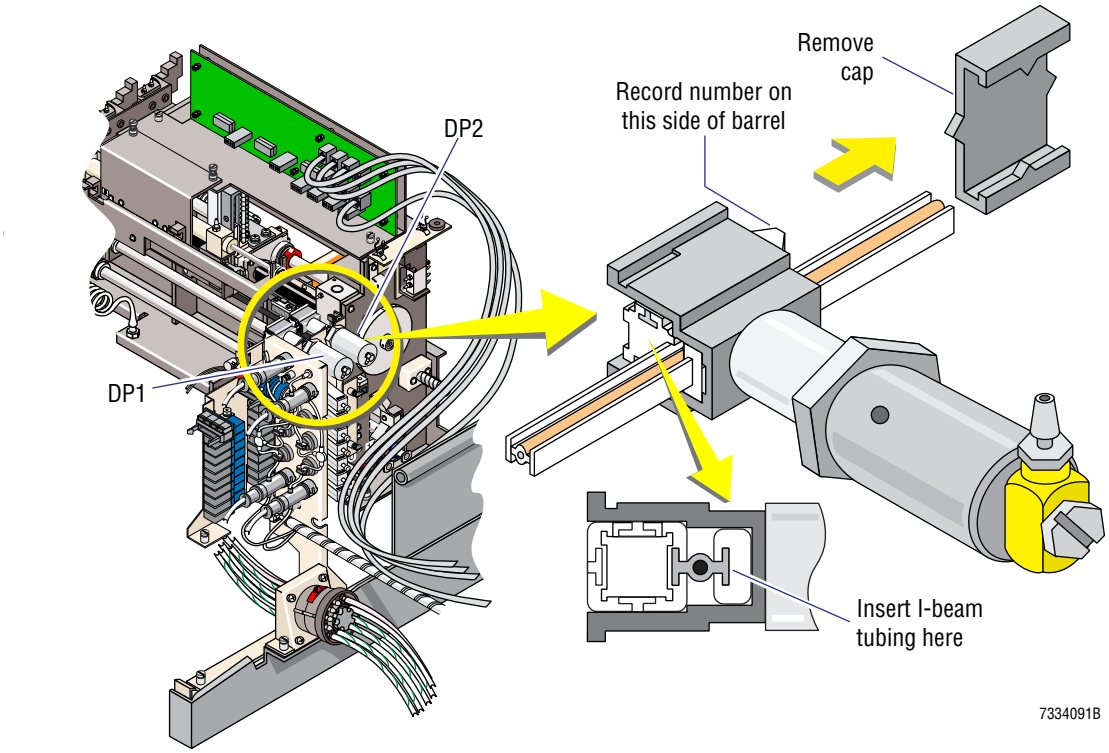
- ❑ Five whole-blood specimens

Procedure

1. Disconnect the I-beam tubing from the top of the dispense probe.
2. Slide the cap off of the dispense pump needing adjustment. See Figure 4.7-1.

   Note: DP1 dispenses the blood in the single-slide mode and for the first slide in the dual-slide mode. DP2 dispenses the blood for the second slide in the dual-slide mode.
3. Note the number written on the side of the dispense pump barrel facing away from the I-beam tubing. See Figure 4.7-1.

Figure 4.7-1 Dispense Pump Adjustments



4. Slide the barrel out of the dispense pump and off the I-beam tubing.
5. Turn the barrel of the dispense pump to change the volume dispensed. To increase the volume dispensed, go up a number; to decrease the volume dispensed, go down a number.
6. Thread the I-beam tubing back through the barrel of the pump and reinstall the barrel in the pump body, ensuring the I-beam tubing remains in both channels as shown in Figure 4.7-1.
7. Reinstall the cap on the dispense pump and reconnect the I-beam tubing on the dispense probe.
8. Ensure the SlideMaker is working correctly. Go to Verification.

Verification

Cycle five whole-blood specimens with the SlideMaker in the appropriate blood mode for the dispense pump adjusted (single- slide or dual-slide) and ensure the SlideMaker is making good quality blood smears.

4.8 CIRCUIT CARD REPLACEMENT

Purpose

Use this procedure as a guide for accessing and replacing the circuit cards in the SlideMaker.

Procedure

CAUTION Risk of damage to electronic components. Removing or replacing a circuit card while the power is ON can damage the circuit card. Power down the SlideMaker before removing or replacing a circuit card.

1. Turn off the main power switch on the back of the SlideMaker and unplug the main power cable from the ac wall outlet.
2. Access the circuit card as described in Table 4.8-1.

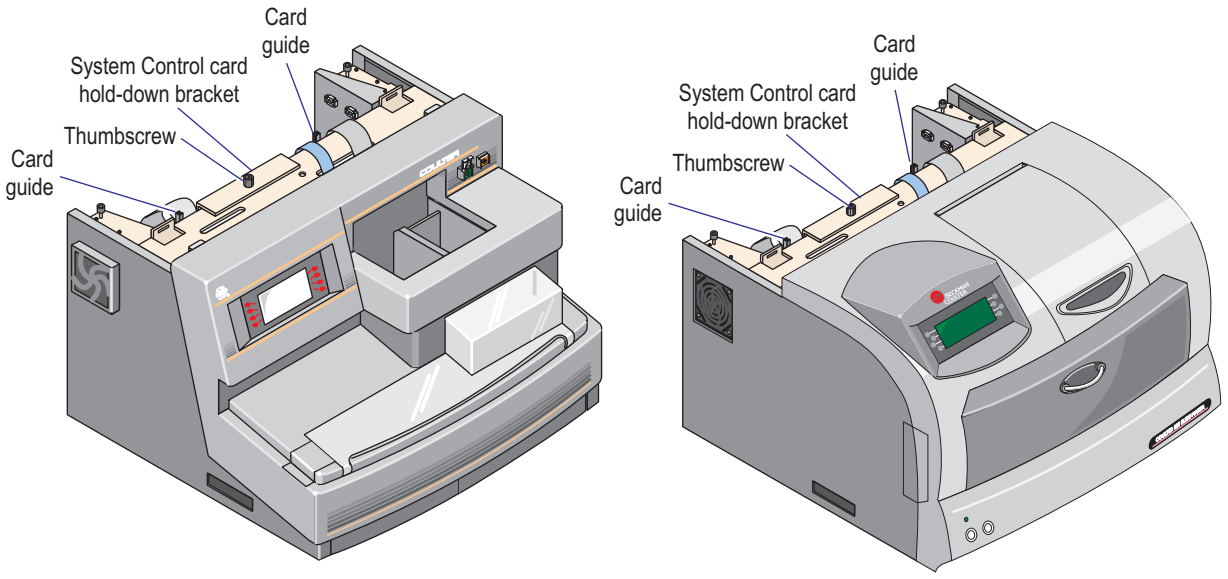
Table 4.8-1 Accessing the SlideMaker Circuit Cards

Card Name	Location Figure	Special Instructions
Basket Corner Sensor (4) - SEN33, SEN34, SEN35, and SEN36	Figure 2.11-1	Remove the cover for the appropriate Basket Corner Sensor card (SEN33 and SEN34 are under the right corner cover, SEN35 and SEN36 are under the left).
Basket Transport Interface	Figure 2.11-1	Remove the cover for the Basket Transport Interface card.
Basket Index - SEN37	Figure 2.11-1	Refer to Heading 4.26, SEN37 (BASKET INDEX SENSOR) REPLACEMENT.
Belt Profile Sensor (2) - SEN32 and SEN39	Figure 2.11-1	
Cassette Empty Sensor - SEN28	Figure 2.6-2	
Dispense 1 Manifold	Figure 2.5-2	Remove the Dispense module. Refer to Dispense Module under Heading 4.1.
Dispense 2 Manifold	Figure 2.5-2	Remove the Dispense module. Refer to Dispense Module under Heading 4.1.
Dryer Exit Sensor - SEN49	Figure 2.9-1	Remove the Dryer module. Refer to Dryer and Slide Elevator Modules under Heading 4.1.
Dryer Interface	Figure 2.9-1	Remove the Dryer module. Refer to Dryer and Slide Elevator Modules under Heading 4.1.
Main Distribution	Figure 2.2-3	1. Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door. 2. Remove the System Control card: a. Disconnect the four connectors on the System Control card. b. Unfasten the thumbscrew on the hold-down bracket for the System Control card and pull the System Control card up, out of the card guides.
Main Fluidics Interface	Figure 2.3-3	Remove the Main Fluidics module. Refer to Main Fluidics Module under Heading 4.1.
Pneumatic Supply Monitor, 5 Psi	Figure 2.3-1	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.

Table 4.8-1 Accessing the SlideMaker Circuit Cards *(Continued)*

Card Name	Location Figure	Special Instructions
Pneumatic Supply Monitor, 6.5 in. Hg	Figure 2.3-1	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
Pneumatic Supply Monitor, 17.5 in. Hg	Figure 2.3-1	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
Pneumatic Supply Monitor, 30 Psi	Figure 2.3-1	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
Pneumatic Supply Monitor, High Vacuum	Figure 2.3-1	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
Power Supply Monitor	Figure 2.2-3	Unfasten the two captive screws securing the top cover of the rear compartment, lift off the cover, and pull down the rear door.
Slide Ejected Sensor - SEN25	Figure 2.6-1	Remove the Cassette Input Queue and Slide Ejector modules. Refer to Cassette Transport Module under Heading 4.1.
Slide Ejector Interface	Figure 2.6-2	Remove the Cassette Input Queue and Slide Ejector modules. Refer to Cassette Transport Module under Heading 4.1.
Smear/Transport Interface	Figure 2.7-1	Remove the plate in front of the Smear/Transport Interface card.
System Control	Figure 2.2-3	To remove the card from the front of the SlideMaker: 1. Unfasten the captive screws securing the top cover for the rear compartment and lift off the cover. 2. Disconnect the four cables from the System Control card. 3. Unfasten the thumbscrew on the System Control card hold-down bracket. See Figure 4.8-1. **Note:** Unfastening this thumbscrew disengages the two System Control card to Main Distribution card connectors, P1/J1 and P2/J2. 4. Pull the System Control card up, out of the card guides. To install the card from the front of the SlideMaker: 1. Position the replacement card in the card guides and push the card down into the connectors on the Main Distribution card. 2. Fasten the thumbscrew on the top of the hold-down bracket to seat the System Control card and lock it in place.
Temperature Sensor	Figure 2.9-1	Lift the plastic cover on the Dryer module and pull up the Temperature Sensor card.

Figure 4.8-1 System Control Card Hold-Down Bracket and Card Guides



3. Disconnect all cables connected to the card.
4. Remove the hardware securing the card, retaining the hardware, and remove the card. For the System Control card, see Table 4.8-1 for special removal instructions.
5. Ensure the revision level of the replacement card is correct.
6. Ensure any jumpers or switches on the replacement card are set correctly. See the appropriate circuit card under Heading A.2, CIRCUIT CARD LAYOUTS WITH KEY COMPONENT DESCRIPTIONS.
7. Install the replacement card, securing the card with the retained hardware. For the System Control card, see Table 4.8-1 for special installation instructions.
8. Connect the disconnected cables to the replacement card. Refer to the appropriate circuit card under Heading A.2, CIRCUIT CARD LAYOUTS WITH KEY COMPONENT DESCRIPTIONS for the correct connector locations.
9. Reinstall any covers removed or opened to access the card.
10. Plug in the main power cable and turn on the SlideMaker.

4.9 FLUID DETECTOR CALIBRATION

Purpose

Calibrate the fluid detectors whenever:

- The SlideMaker displays an excessive number of fluid detector error messages.
- You move or replace the tubing in any of the fluid detectors.
- You replace a fluid detector.

Tools/Supplies Needed

- ❑ 12 whole-blood specimens

Procedure

1. On the SlideMaker screen, select **MONITOR/ADJUST FLUID DETECTORS (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ MONITOR/ADJUST FLUID DETECTORS.**

   Note: You can calibrate all the fluid detectors at once, or a single fluid detector. The default setting for **CHANNEL SELECTION** is **ALL**. To calibrate a single fluid detector, increment the **CHANNEL SELECTION** setting until the number of the fluid detector you want to calibrate is displayed.

CAUTION Using the FILL DILUENT function overlong fills the vacuum overflow tank in the GEN•S System. Do the fluid detector calibration promptly. If a delay is unavoidable, select **DRY SYSTEM** to drain the lines.

2. On the Monitor/Adjust Fluid Detectors screen, select **FILL DILUENT** to prime all the aspirate lines and both sample reservoirs with diluent.

   Note: The fluid detectors are calibrated with diluent.

3. Select **INCREASE VOLTAGE** to enable calibration of the fluid detectors.
4. Verify that the readings for all the fluid detectors are within the voltage tolerance listed for diluent calibration in the Fluid Detector Voltage Specifications under Heading A.1, TOLERANCES AND LIMITS.
   - If all of the fluid detectors are within tolerance, go to step 6.
   - If any of the fluid detectors are outside the tolerance, or a message appears indicating the calibration failed, go to step 5.
5. If one or more fluid detectors failed calibration:
   a. Select **EXIT** to leave the Monitor/Adjust Fluid Detectors screen, then select **MONITOR/ADJUST FLUID DETECTORS** to re-enter the screen.

      Note: Using the **INCREASE VOLTAGE** option locks up the Monitor/Adjust Fluid Detectors screen. Exiting the screen unlocks the screen functions.

   b. If exiting and entering the Monitor/Adjust Fluid Detectors screen does not unlock the screen functions, reset the SlideMaker and repeat from step 1.

   c. Monitoring the voltage for the fluid detector that failed, try to correct the problem.

   d. After correcting the problem, repeat from step 3.

6. Select **EXIT** to leave the Monitor/Adjust Fluid Detectors screen, then select **MONITOR/ADJUST FLUID DETECTORS** to re-enter the screen.

   Note: Using the **INCREASE VOLTAGE** option locks up the Monitor/Adjust Fluid Detectors screen. Exiting the screen unlocks the screen functions.

7. On the Monitor/Adjust Fluid Detectors screen, select **DRY SYSTEM** to remove the diluent from the aspirate lines and both sample reservoirs.
8. After drying the aspirate lines and sample reservoirs, verify that the readings for all the fluid detectors are within the voltage tolerance listed for air in the Fluid Detector Voltage Specifications under Heading A.1, TOLERANCES AND LIMITS.
   - If all of the fluid detectors are within tolerance, exit this function and ensure the SlideMaker is working correctly. Go to Verification.
   - If any of the fluid detectors are outside the tolerance, repeat this procedure.

Verification

Cycle 12 whole-blood specimens with SlideMaker smears requested on the GEN•S System or the LH 750 System, and ensure the SlideMaker does not display any fluid detector messages.

4.10 SOFTWARE INSTALLATION USING A LAPTOP COMPUTER

Purpose

Use this procedure to install new software on the SlideMaker using a laptop computer instead of the Workstation.

Tools/Supplies Needed

- ❑ Laptop computer
- ❑ Computer disk with new software
- ❑ Cable for connecting laptop computer to SlideMaker

Procedure

1. Connect the laptop to SlideMaker cable to the COM1 port on your laptop computer and place the laptop near the SlideMaker.
2. Turn off the SlideMaker.
3. Open the rear door of the SlideMaker and reconfigure the jumpers on the System Control card:
   a. Remove the jumpers from E3-E5 and E4-E6 (the normal opto configuration).
   b. Install the jumpers on E1-E3 and E2-E4 (the RS232 configuration needed for the laptop).
4. At the rear of the SlideMaker, disconnect the cable from the Analytical Station and replace it with the cable from the laptop.
5. Insert the software disk into your laptop computer, type `A:\INSTALL,` and press Enter.
6. When the Coulter Communications screen displays, *Select any key to continue*, press any key.
7. When the Command Menu appears, press Shift+2 to select **Download 'A' and 'B.'**
8. While the Download 'A' and 'B' option is highlighted, turn on the SlideMaker. The Download Simulator screen appears, displaying the status of the software installation.
9. After the SlideMaker initializes, indicating the download is finished, press Alt+X to exit.
10. Turn off the SlideMaker.
11. At the rear of the SlideMaker, disconnect the cable from the laptop and replace it with the cable from the Analytical Station.
12. Reconfigure the jumpers on the System Control card:
    a. Remove the jumpers from E1-E3 and E2-E4.
    b. Install the jumpers on E3-E5 and E4-E6 (the normal opto configuration).
13. Turn on the SlideMaker.
14. Verify the SlideMaker screen displays the correct versions of software:
    a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ SYSTEM SETTINGS**.
    b. Ensure the software versions displayed on the screen match the versions listed for the software you installed.

4.11 SEN41 (VERTICAL SLIDE SENSOR) ALIGNMENT

Purpose

Adjust the vertical slide sensor, SEN41, to ensure it senses a slide in the basket correctly whenever:

- The SlideMaker generates excessive basket sensor errors.
- You replace the vertical slide sensor, SEN 41.
- You replace the basket index sensor, SEN37.

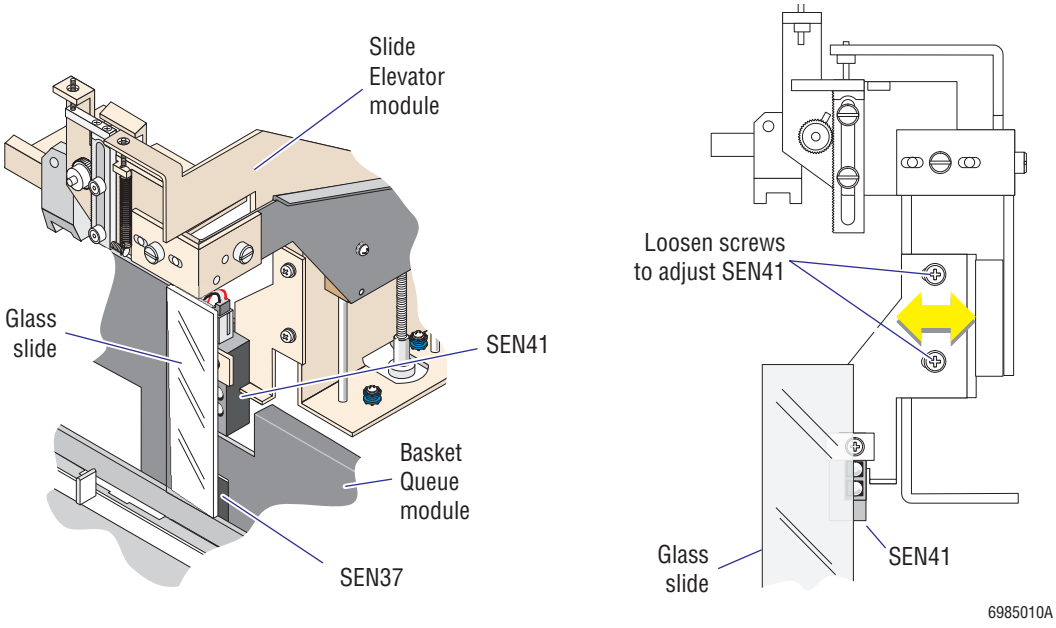
Tools/Supplies Needed

❑ Clean glass slides

Procedure

1. In the Basket Queue module, remove any slide basket in front of SEN41.
2. Holding a glass slide with its long edge oriented vertically, place the flat side of the slide against the rear wall of the Basket Queue module and the bottom edge on the base of the module as shown in Figure 4.11-1a.

Figure 4.11-1 Aligning the Vertical Slide Sensor, SEN41



a. Positioning slide

b. Checking alignment

3. Move the slide until the right edge of the slide is aligned with the center of the SEN37 housing. See Figure 4.11-1a.
4. Verify that the right edge of the slide is now aligned with the center of the three LEDs on SEN41 as shown in Figure 4.11-1b.

5. If the slide is not aligned correctly with SEN41:
   a. Loosen the screws securing the vertical slide sensor's bracket. Refer to Figure 4.11-1b.
   b. Move the sensor horizontally until it is in the correct position.

      Note: Ensure that SEN41 remains vertical (not skewed) during this alignment.
   c. Tighten the screws and verify operation. Go to Verification.

Verification

1. Place a glass slide in a slide basket and place the basket on the rear track of the Basket Queue module.
2. On the SlideMaker screen, select **BASKET TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ BASKET TEST**) and advance the rear belt until the slide is in front of SEN37.
3. Select **SENSOR STATUS** (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**), and verify that both SEN37 and SEN41 are active. If either sensor is inactive, readjust SEN41 until it is aligned with SEN37.
4. Remove the slide from the basket and verify SEN37 and SEN41 are inactive.
5. Select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
6. Do five dry cycles and ensure the platen releases the slide into the slide basket correctly.
7. If the platen is not releasing slides into the slide basket correctly, check the platen adjustments. See Heading 4.6, SLIDE ELEVATOR PLATEN ADJUSTMENTS.

4.12 PRINTHEAD CLEANING

Purpose

Use this procedure to clean the printhead whenever:

- The Label Printer module fails to advance the label roll correctly.
- The print quality of the labels is poor.
- The Label Printer module fails to print a label.
- A label is stuck on the printer drive roller.

Tools/Supplies Needed

❑ Isopropyl alcohol and a cotton swab

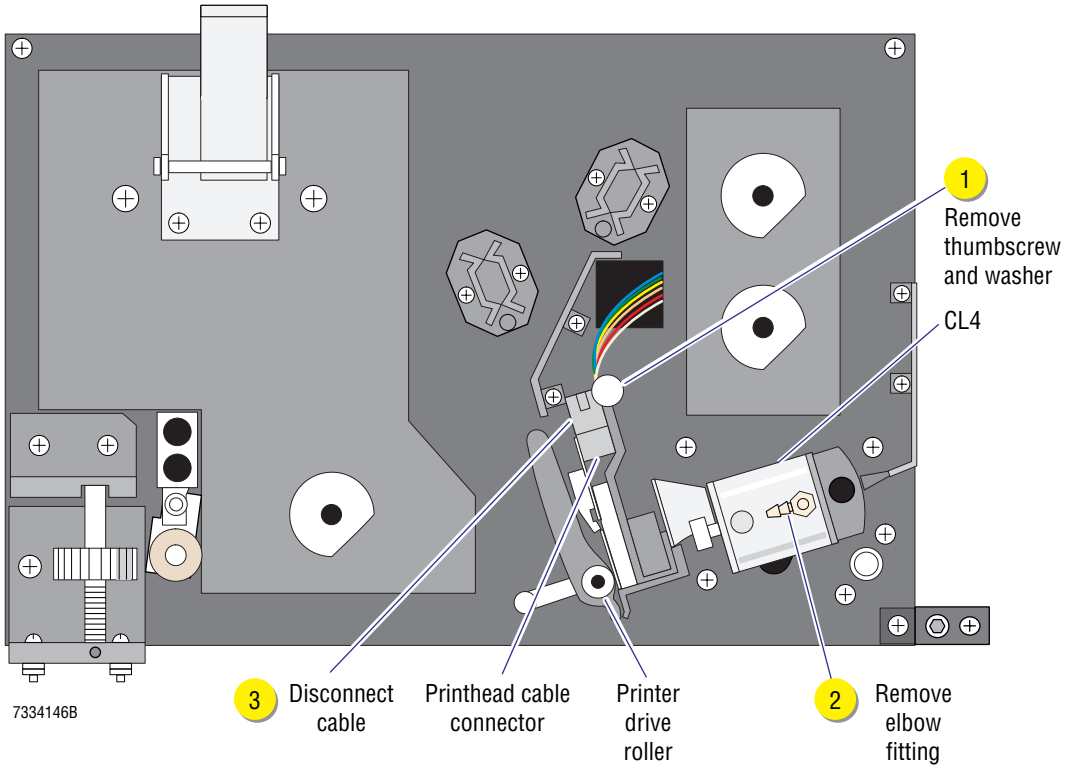
or

❑ An alcohol pad

Procedure

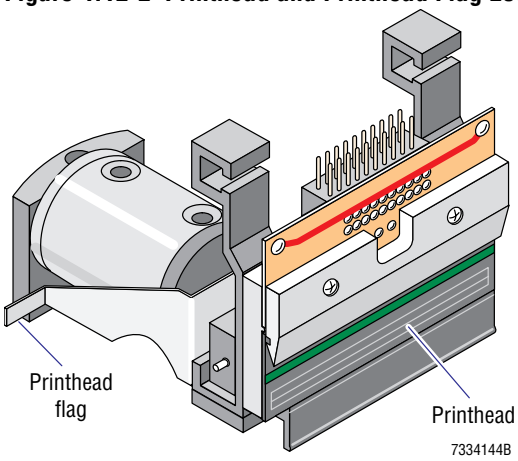
1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Unscrew and remove the knurled thumbscrew securing the printhead assembly to the front panel of the Label Printer module. See Figure 4.12-1. Set the thumbscrew and its associated washer aside.

Figure 4.12-1 Removing the Printhead Assembly



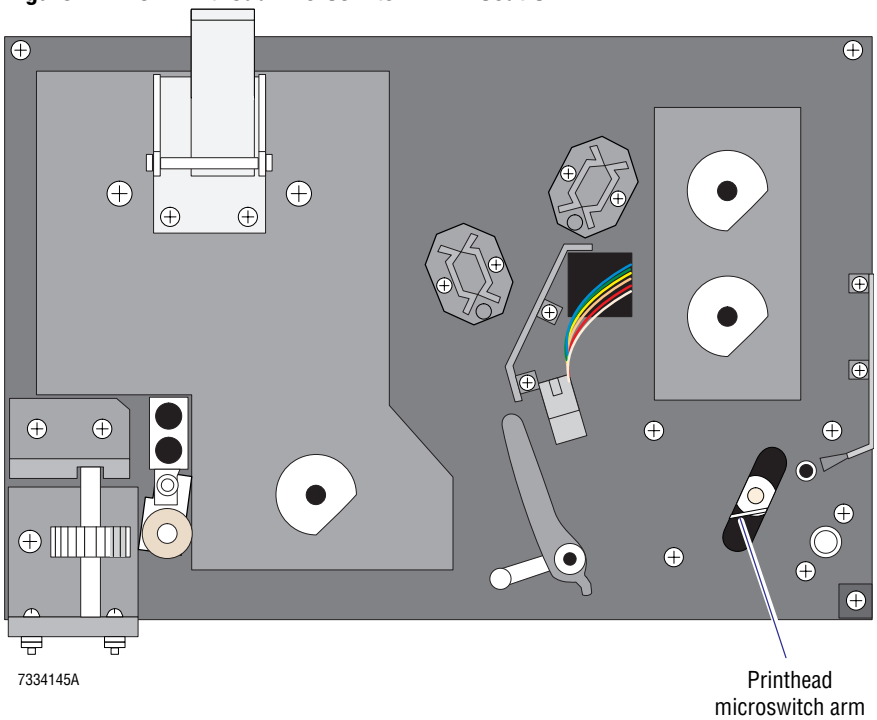
3. Unscrew and set aside the elbow fitting on CL4. Refer to Figure 4.12-1. It is not necessary to disconnect the tubing from the fitting.
4. Carefully pull the printhead assembly toward you until the printhead cable connector is accessible. Refer to Figure 4.12-1.
5. Disconnect the printhead cable and remove the printhead assembly from the instrument.
6. Remove any stuck labels from the printer drive roller (Figure 4.12-1).
7. Clean the printer drive roller and the printhead (Figure 4.12-2) with a cotton swab moistened with isopropyl alcohol or an alcohol pad, ensuring all residual adhesive is removed.

Figure 4.12-2 Printhead and Printhead Flag Location



8. Reinstall the printhead, ensuring the printhead flag (Figure 4.12-2) is positioned above the printhead microswitch arm (Figure 4.12-3), and the ribbon is positioned correctly.

Figure 4.12-3 Printhead Microswitch Arm Location



9. Reinstall the elbow fitting on CL4.
10. Plug in the main power cable and turn on the SlideMaker.
11. Go to Verification.

Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do five dry cycles and ensure the Label Printer module is working correctly and the print quality of the labels is acceptable.

4.13 EXTENDED AND LONG-TERM SHUTDOWN

Purpose

If the SlideMaker is not operated for 48 hours or more, the reagents can dry out and precipitate. Use the following shutdown procedure to prevent this problem.

Tools/Supplies Needed

- ❑ 1 L deionized or distilled water in a container
- ❑ Empty container (for long-term shutdown only)
- ❑ Red pinch valve deactivator clips (for long-term shutdown only)

Procedure

1. Clean the SlideMaker before shutting it down:
   - If the SlideMaker will remain in the laboratory, on the SlideMaker screen select **RUN SHUT DOWN (MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN**). Let the cleaning reagent remain in the instrument for at least 30 minutes.
   - If the SlideMaker will be transported, do the flush procedure. Refer to the Flush procedure for the SlideMaker in the Online Help system.

ATTENTION: Do not remove the waste pickup tube.

2. Remove the diluent and cleaning reagent pickup tubes from their reagent containers and place the tubes in a container of deionized water.

   Note: The SlideMaker reagent lines are connected to the same pickup tubes as the Analytical Station reagent lines.

3. Cycle deionized water through the reagent lines:
   a. Select **RUN SHUT DOWN (MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN**) four times.
   b. Select **RUN START UP (MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN START UP**) four times.
4. If the SlideMaker will be shut down for less than seven days, it is acceptable to leave the deionized water in the SlideMaker. Go to step 7.
5. If the SlideMaker will be shut down for seven days or longer, remove the deionized water. Go to step 6.
6. Cycle air through the reagent lines:
   a. Remove the reagent pickup tubes from the container of deionized water and place them in an empty container.
   b. Disconnect the cable for SEN47, the level sensor for the reagent tank, from the Main Fluidics Interface card.
   c. Select **RUN SHUT DOWN (MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN**) four times.
   d. Select **RUN START UP (MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN START UP**) four times.
7. Power down the SlideMaker.

8. If the SlideMaker will be transported:
   a. Remove the label roll and ribbon from the Label Printer module.
   b. Remove the slide cassettes and any slides in the slide ejector, shuttle, dryer, or slide elevator areas.
   c. Remove any slide baskets from the Basket Queue module.
   d. Disconnect and disassemble the SlideMaker as necessary.
9. If the SlideMaker will be shut down for seven days or longer, install red pinch valve deactivator clips on the pinch valves. Refer to Figure 3.4-9 for pinch valve locations.

4.14 DISPENSE PROBE CLEANING/REPLACEMENT

Purpose

Use this procedure to clean or replace the dispense probe.

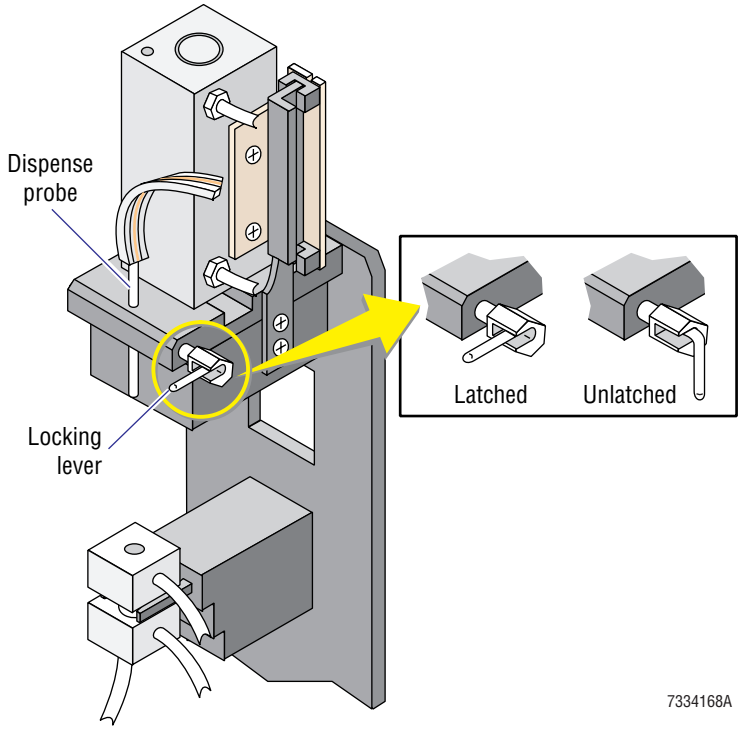
Tools/Supplies Needed

- ❑ A hypochlorite solution with 5% available chlorine (for cleaning the dispense probe)

Procedure

1. Unlatch the locking lever on the dispense probe (pull the lever out and turn the lever up or down) as shown in Figure 4.14-1.

Figure 4.14-1 Removing the Dispense Probe



2. Lift the dispense probe up out of the dispense probe mechanism and disconnect the tubing from the probe.
3. Clean the dispense probe with the hypochlorite solution and rinse it with water, or replace the dispense probe, as necessary.
4. Connect the tubing to the cleaned or new dispense probe and push the probe through the clearance hole in the dispense probe mechanism.
5. Latch the locking lever on the dispense probe (Figure 4.14-1).
6. Manually slide the dispense probe up and down until the locking lever drops into the groove on the probe.
7. Verify the dispense probe mechanism is working correctly. Go to Verification.

Verification

Do five whole blood cycles and ensure the dispense probe mechanism is working correctly.

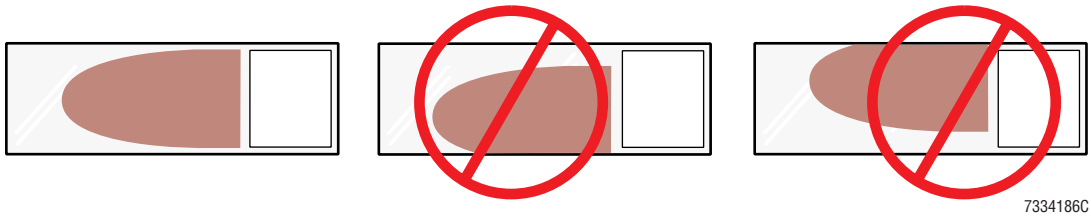
4.15 SLIDE EJECTOR ADJUSTMENTS/ALIGNMENT

Purpose

This section contains two procedures, one for adjusting the slide pusher and one for aligning the slide ejector.

- Use the Slide Pusher Adjustment procedure to ensure the slide pusher ejects the slides smoothly and straight. Do the slide pusher adjustment procedure whenever:
  - You remove and reinstall the slide pusher.
  - You have slide registration errors you are unable to resolve.
- Use the Slide Ejector Alignment procedure on instruments with the **old configuration of the smear truck** (see Figure 4.18-2) to ensure that when the smear truck picks up the slide, the slide is centered on the truck. Centering the slide on the smear truck ensures the slide is centered on the shuttle and ultimately that the smear is centered on the slide correctly in the Y-dimension as shown in Figure 4.15-1.

Figure 4.15-1 Checking the Smear Position on the Slide in the Y-Dimension



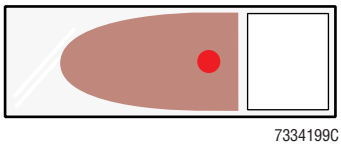
Do the slide ejector alignment on instruments with this old configuration whenever:

- The smear is not centered on the slide in the Y-dimension.
- The slide is not centered on the smear truck, creating a vacuum leak.
- You have adjusted the slide pusher.
- Blood smears are skewed.

- Use the Slide Ejector Alignment procedure on instruments with the **new configuration of the smear truck** (see Figure 4.18-3) to ensure that the slide is centered on the shuttle.

  Note: The new configuration of the smear truck includes an adjustment for centering the slide on the smear truck at the slide pickup position.

Figure 4.15-2 Acceptable Blood Drop and Smear Placement



In a perfectly aligned system, the blood drop is placed on the imaginary center line of a slide and the smear is centered between the long edges of the slide as shown in Figure 4.15-2.

This alignment is achieved by a combination of slide ejector and smear truck alignments.

Do the slide ejector alignment on instruments with this new configuration whenever:

- You have adjusted the slide pusher.
- Blood smears are skewed.
- The slide is not centered on the shuttle.

Tools/Supplies Needed

- ❑ 6 in. rule (for the Slide Pusher Adjustment)
- ❑ Five whole-blood specimens

Slide Pusher Adjustment

1. Remove all slide cassettes in the Cassette Input Queue.
2. If there is a slide on the slide pickup bridge, remove it.
3. Loosen the four mounting screws for the slide pusher (Figure 4.15-3 or Figure 4.15-4) about 1/8 turn.

Figure 4.15-3 Verifying the Position of the Slide Pusher in the Slide Ejector Module, Old Configuration

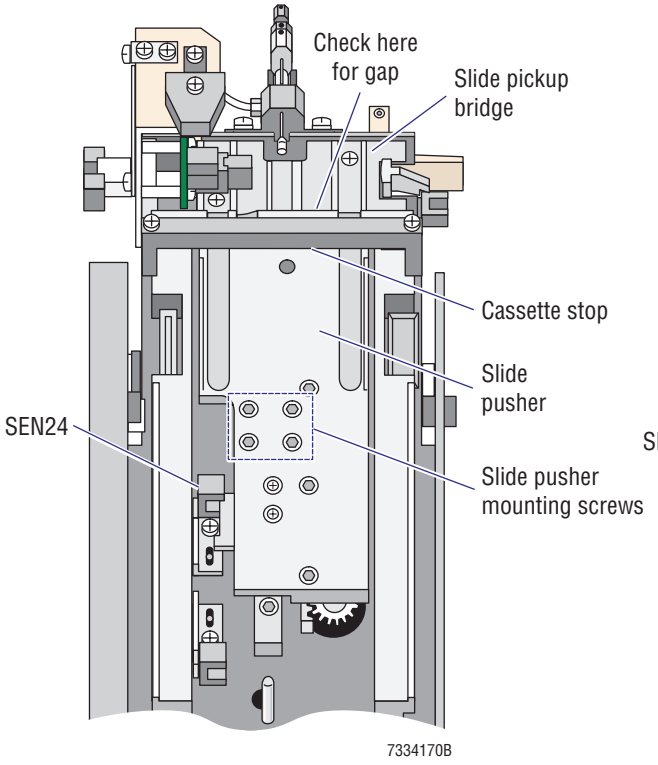
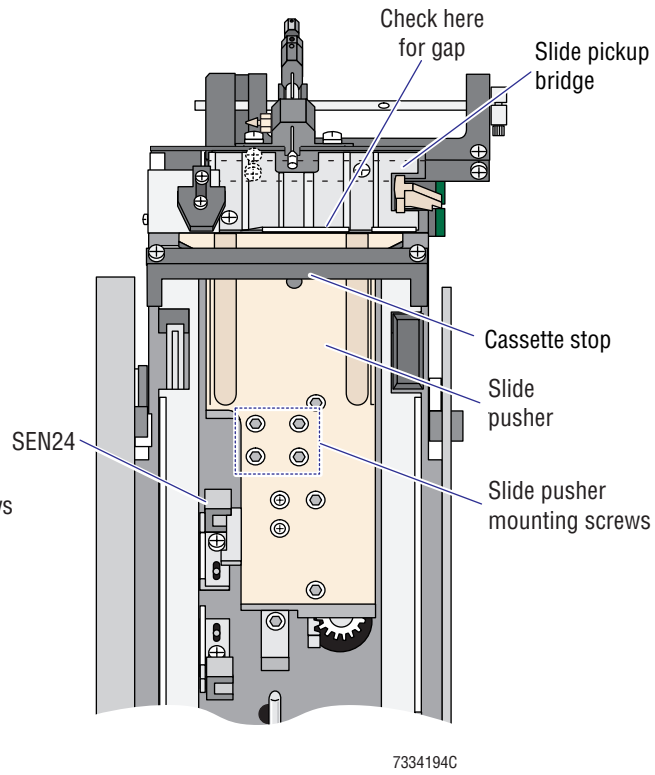


Figure 4.15-4 Verifying the Position of the Slide Pusher in the Slide Ejector Module, New Configuration



4. Place a 6 in. metal rule in the slide ejection station:
   a. If the slide pusher is extended, place the metal rule on the slide pusher, butting the rule against the cassette stop.
   b. If the slide pusher is retracted, place the metal rule on the exposed rails between the slide pusher and the cassette stop, butting the rule against the cassette stop.
5. On the SlideMaker screen, select **SLIDE EJECT** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ SLIDE EJECT**). The slide pusher is retracted and then extended to eject a slide.

WARNING Personal injury. The motor for the slide pusher is very strong and will pinch your fingers if they are caught between the slide pusher and the rule. While holding the rule, be careful not to place your fingers in the path of the slide pusher.

6. Hold the metal rule in place. If the rule is on top of the slide pusher, as the slide pusher is retracted, hold the rule against the cassette stop and allow it to seat on the exposed rails.
7. As the slide pusher is extended, continue to hold the rule in place until the slide pusher reaches the rule and holds it against the cassette stop.
8. While the motor is stalling and the slide pusher is holding the rule, tighten the two mounting screws closest to the cassette stop.
9. Repeat steps 5 through 7. While the motor is stalling and the slide pusher is holding the rule, tighten the other two mounting screws for the slide pusher.
10. Repeat steps 5 through 7. While the slide pusher is holding the rule, verify the entire edge of the slide pusher is contacting the rule. If the slide pusher is skewed, leaving a gap between the slide pusher and the rule, repeat from step 3 to readjust the slide pusher.
11. Ensure the slide ejector is still aligned correctly. Go to Slide Ejector Alignment.

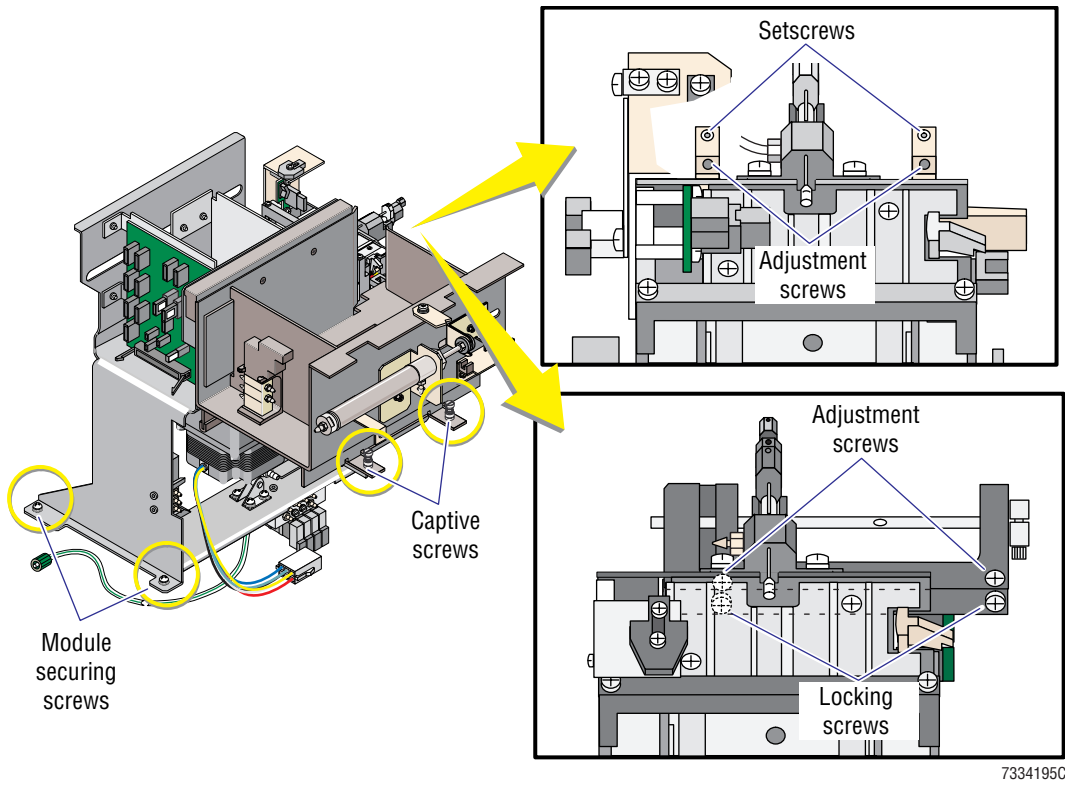
Slide Ejector Alignment

1. In the Slide Ejector module, verify the slide pusher is extended all the way to the slide pickup bridge. Refer to Figure 4.15-3 or Figure 4.15-4.
   - If there is a gap between the slide pusher and the bridge, reposition the slide pusher extended sensor, SEN24. Go to step 2.
   - If the slide pusher is in the correct position, the slide pusher extended sensor, SEN24, is adjusted correctly. Go to step 3.
2. Reposition SEN24.
   a. Loosen the securing screw for SEN24. Refer to Figure 4.15-3 or Figure 4.15-4.
   b. Move SEN24 closer to the pickup station platform and tighten the screw.
   c. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and check the position of the slide pusher.
   d. Repeat steps a though c until the slide pusher is extended all the way to the pickup station platform.
   e. Ensure the slide ejector is aligned correctly. Go to Verification.
3. Remove the Cassette Transport module's securing screws, and unfasten the captive screws on the right side. See Figure 4.15-5.

   Note: For better access to the Slide Ejector module, lift out and set aside the Cassette Output Queue module.
4. Determine the configuration of the Slide Ejector module. See Figure 4.15-5.

   Note: Two configurations of the Slide Ejector module are currently in the field. Earlier models have setscrews securing the back of the Slide Ejector module. In later models the setscrews are eliminated and the adjustment screws are relocated.
   - If this model of the Slide Ejector module has setscrews securing the back, go to step 5.
   - If this model of the Slide Ejector module does not have setscrews, go to step 6.

Figure 4.15-5 Loosening the Slide Ejector Module



5. To reposition a Slide Ejector module with setscrews securing the back:
   a. Ensure the module securing screws (Figure 4.15-5) are removed.
   b. Unfasten the captive screws securing the upper cassette transfer mechanism and move the mechanism to access the Slide Ejector module's adjustment screws. Refer to step 4 of the Cassette Output Queue Module removal procedure under Heading 4.1.
   c. Loosen the setscrews securing the back of the Slide Ejector module. Refer to Figure 4.15-5.
   d. To move the Slide Ejector module straight forward or backward, adjust both adjustment screws:
      - To move the Slide Ejector module toward the back of the SlideMaker, turn the adjustment screws counterclockwise, then push the module.
      - To move the Slide Ejector module toward the front of the SlideMaker, turn the adjustment screws clockwise.

ATTENTION: Rotate the Slide Ejector module if the spreader slide edge does not remain parallel to the smear slide edge (the blood smears are skewed).

e. To rotate the Slide Ejector module, adjust only one of the adjustment screws:
   - If the near corner of the spreader slide is not making contact with the smear slide, rotate the Slide Ejector module clockwise (as viewed from above) by turning the right adjustment screw clockwise or the left adjustment screw counterclockwise.
   - If the far corner of the spreader slide is not making contact with the smear slide, rotate the Slide Ejector module counterclockwise (as viewed from above) by turning the right adjustment screw counterclockwise or the left adjustment screw clockwise.

f. Tighten the setscrews.

g. Reinstall the upper cassette transfer mechanism.

h. Go to step 7.

6. To reposition a Slide Ejector module without setscrews:

   a. Ensure the module securing screws (Figure 4.15-5) are removed.

   b. Loosen the two locking screws. Refer to Figure 4.15-5.

   c. To move the Slide Ejector module straight forward or backward, adjust both adjustment screws:
      - To move the Slide Ejector module toward the back of the SlideMaker, turn the adjustment screws clockwise.
      - To move the Slide Ejector module toward the front of the SlideMaker, turn the adjustment screws counterclockwise.

   ATTENTION: Rotate the Slide Ejector module if the spreader slide edge does not remain parallel to the smear slide edge (the blood smears are skewed).

   d. To rotate the Slide Ejector module, adjust only one of the adjustment screws:
      - If the near corner of the spreader slide is not making contact with the smear slide, rotate the Slide Ejector module clockwise (as viewed from above) by turning the right adjustment screw counterclockwise or the left adjustment screw clockwise.
      - If the far corner of the spreader slide is not making contact with the smear slide, rotate the Slide Ejector module counterclockwise (as viewed from above) by turning the right adjustment screw clockwise or the left adjustment screw counterclockwise.

   e. Tighten the two locking screws.

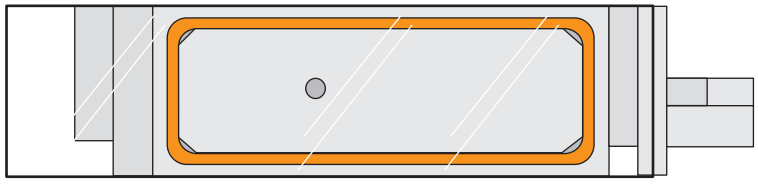
7. Reinstall the screws in the front of the Cassette Transport module, and fasten the captive screws on the right side. Refer to Figure 4.15-5.

8. Ensure the slide ejector is aligned correctly. Go to Verification.

Verification

1. Ensure the back of the slide cassette does not contact the arm of the upper cassette transfer mechanism.
2. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
3. Do five dry cycles and ensure the O-ring in the shuttle makes a complete seal with the slide and the slide is centered on the shuttle as shown in Figure 4.15-6.

Figure 4.15-6 Slide Centered on Shuttle Correctly



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4. Do five whole blood cycles and ensure:
   - On instruments with the **old configuration of the smear truck**, the smear is centered on the slide as shown in Figure 4.15-1.
   - On instruments with the **new configuration of the smear truck**, the blood drop and smear are centered on the slide as shown in Figure 4.15-2.
5. If the SlideMaker does not meet these criteria, align the smear truck as directed under Heading 4.18, SMEAR TRUCK ALIGNMENT CHECKS AND ADJUSTMENTS.

4.16 SLIDE PUSHER BARS AND SHUTTLE BRUSH ADJUSTMENTS

Purpose

The slide pusher bars transfer the slides from the shuttle to the dryer. The shuttle brush is attached to the slide pusher bar mechanism and is used to brush debris off the shuttle.

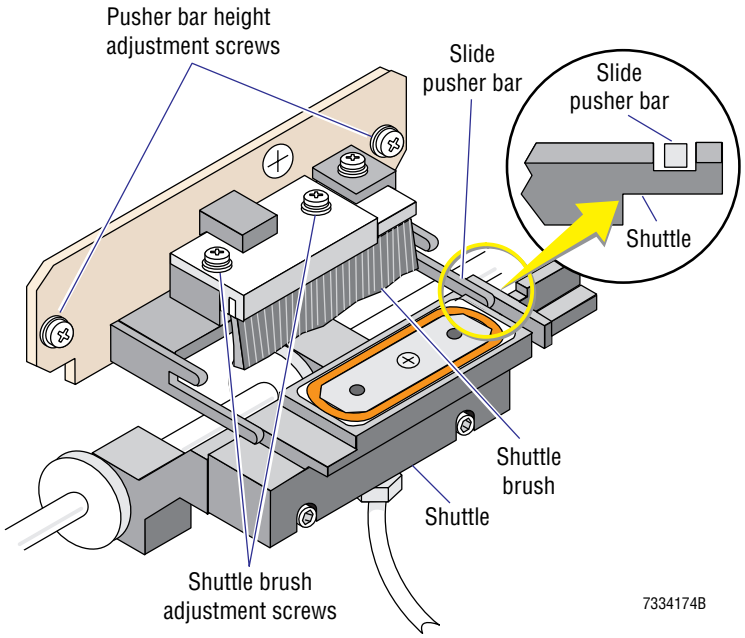
- Use the slide pusher bars adjustment to ensure the bottom surfaces of the slide pusher bars do not touch the shuttle when transferring a slide to the dryer and that the slide does not contact the conveyer belts during the transfer.
- Use the shuttle brush adjustment to ensure the shuttle brush is at the correct height above the shuttle whenever:
  - You adjust the slide pusher bars.
  - Debris remains on the shuttle, causing shuttle vacuum errors.

Slide Pusher Bars Adjustment

1. Remove the Cassette Output Queue module to access the slide pusher bar mechanism. See the Cassette Output Queue Module removal procedure under Heading 4.1.
2. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)**.
3. De-energize SOL44 to disable the shuttle vacuum.
4. Remove the slide from the shuttle.
5. Energize and de-energize SOL41 to exercise the slide pusher bars and ensure the slide pusher bars do not touch the shuttle. See Figure 4.16-1.

   Note: The slide pusher bars adjustment determines the vertical (up and down) position of the slide pusher bars within the shuttle; the home offset setting determines the horizontal (left to right) position of the slide pusher bars within the shuttle.

Figure 4.16-1 Slide Pusher Bars and Shuttle Brush Adjustments



- If the slide pusher bars do not touch the shuttle, check the slide transfer to the conveyer belts. Go to step 6.
- If the bottom surfaces of the slide pusher bars do not touch the shuttle, but the left or right sides do, check the home offset setting. Go to Setting the Home Offset under Heading 4.3, HOME, PRINTER AND DISPENSE OFFSET SHUTTLE POSITION ADJUSTMENTS.
- If the bottom surfaces of the slide pusher bars touch the shuttle, adjust the slide pusher bars. Go to step 7.

6. With the slide pusher bars extended, manually place a glass slide on the bars and verify the slide does not touch the conveyer belts.
   - If the slide does do not touch the conveyer belts, no adjustment is needed. Reinstall the Cassette Output Queue module and go to Verification.
   - If the slide is touching the conveyer belts, adjust the slide pusher bars. Go to step 7.

CAUTION If the slide pusher bars are too high, they can interfere with movement of the smear truck. When adjusting the slide pusher bars, ensure they are low enough for the smear truck to clear them.

7. Adjust the slide pusher bars:
   a. Remove the Cassette Input Queue and Slide Ejector modules to access the left height adjustment screw. See the Cassette Transport Module removal procedure under Heading 4.1.
   b. Loosen the pusher bar height adjustment screws. Refer to Figure 4.16-1.
   c. Adjust the height of the pusher bar mechanism until the slide pusher bars do not touch the shuttle and the slide does not contact the conveyer belts.
   d. Tighten the screws.
   e. Reinstall the Cassette Input Queue and Slide Ejector modules.
8. Re-adjust the height of the shuttle brush. Go to Shuttle Brush Adjustment and begin at step 5.

Shuttle Brush Adjustment

1. Remove the Cassette Output Queue module to access the smear truck. See the Cassette Output Queue Module removal procedure under Heading 4.1.
2. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)**.
3. De-energize SOL44 to disable the shuttle vacuum.
4. Remove the slide from the shuttle.
5. Energize and de-energize SOL41 to exercise the shuttle brush. As the brush moves over the shuttle, ensure the brush just touches the surface of the shuttle.
   - If the shuttle brush is at the correct height, no adjustment is needed. Go to Verification.
   - If the shuttle brush is not at the correct height, adjust the height. Go to step 6.

CAUTION Removing the shuttle brush adjustment screws will release the two compression springs under the shuttle brush that maintain the adjustment setting. If you remove the adjustment screws, be careful not to lose the springs.

6. With SOL41 energized, adjust the shuttle brush adjustment screws (Figure 4.16-1):
   - Clockwise to lower the shuttle brush.
   - Counterclockwise to raise the shuttle brush.
7. Repeat steps 5 and 6 until the shuttle brush is at the correct height.
8. Reinstall the Cassette Output Queue module.
9. Verify the shuttle brush is operating correctly. Go to Verification.

Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**)
2. Do five dry cycles and ensure the slide pusher bars and shuttle brush are working correctly.

4.17 SLIDE STRIPPER PLATE ADJUSTMENT

Purpose

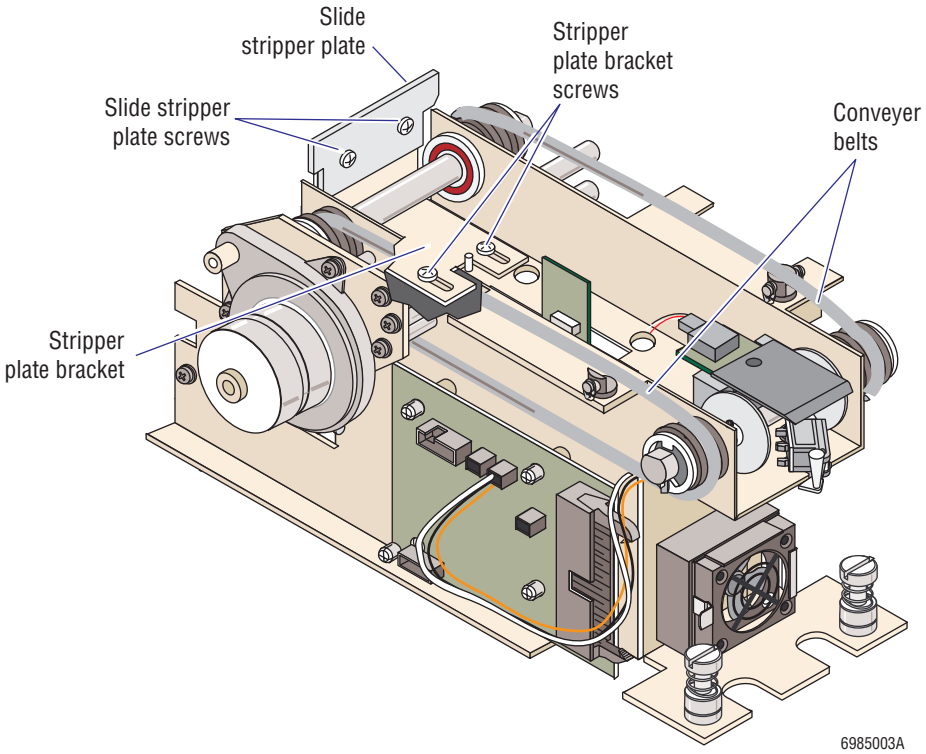
The slide stripper plate strips the slide off the slide pusher bars. Use the slide stripper plate adjustment to ensure that when the slide pusher bars transfer a slide from the shuttle to the dryer, the slide:

- Is removed from the pusher bars by the stripper plate.
- Is deposited on the conveyer belts straight, not at an angle.
- Remains on the conveyer belts. It is not pulled back onto the shuttle.

Procedure

1. Remove the Cassette Output Queue module to access the slide stripper plate. See the Cassette Output Queue Module removal procedure under Heading 4.1.
2. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)**.
3. De-energize SOL44 to disable the shuttle vacuum.
4. Energize SOL41. The slide pusher bars extend, pushing the slide from the shuttle to the dryer.
5. De-energize SOL41 and verify that as the slide pusher bars retract, the slide is stripped off the slide pusher bars and aligned correctly on the conveyer belts in the Dryer module.
   - If the slide is deposited in the Dryer module correctly, no adjustment is needed. Go to step 8.
   - If the slide remains on the shuttle or is deposited on the conveyer belts at an angle, adjust the slide stripper plate. Go to step 6.
6. Adjust the location (front/back) of the slide stripper plate:
   a. Manually place a slide on the shuttle.
   b. Energize SOL41 to push the slide into the dryer.
   c. Ensure the slide stripper plate is located behind the rear edge of the slide and is parallel to the slide.
      - If the slide stripper plate is positioned correctly, go to step 7.
      - If the slide stripper plate is not positioned correctly, go to d.
   d. Loosen the stripper plate bracket screws. See Figure 4.17-1.
   e. Move the stripper plate bracket to the correct position and tighten the bracket screws.
   f. De-energize SOL41 and verify that as the slide pusher bars retract the slide is stripped off the slide pusher bars.
      - If the slide stripper plate is stripping the slide correctly, no further adjustment is needed. Go to Verification.
      - If the slide stripper plate is not stripping the slide correctly, adjust the height of the stripper plate. Go to step 7.

Figure 4.17-1 Slide Stripper Plate and Screws



7. Adjust the height of the slide stripper plate:
   a. Loosen the slide stripper plate screws. Refer to Figure 4.17-1.
   b. Adjust the slide stripper plate up or down as necessary.
   c. Tighten the screws just enough to hold the adjustment.
   d. Manually place a slide on the shuttle, and energize and de-energize SOL41 to check the operation of the slide stripper plate.
   e. Repeat from step a until the slide stripper plate is stripping slides correctly.
   f. Fully tighten the slide stripper plate screws.
8. Reinstall the Cassette Output Queue module.
9. Ensure the slide stripper plate is working correctly. Go to Verification.

Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do five dry cycles and ensure the slides are transferred from the shuttle to the dryer correctly.

4.18 SMEAR TRUCK ALIGNMENT CHECKS AND ADJUSTMENTS

Purpose

The smear truck adjustments are critical because they affect how the slide is picked up from the slide pickup bridge, how the slide is deposited on the shuttle, and how the smear is made. Adjustments on the smear truck assembly allow you to:

- Reposition the tilt lever driving nut.
- Adjust the degree of tilt when the smear truck is in the fully raised position.

  Note: This adjustment affects the degree of rotation from the horizontal plane along the short edge of the slide.
- Adjust the height of the smear truck in the fully raised position.
- Adjust the degree of tilt when the smear truck tilts down.
- Adjust the horizontal position of the truck (**new smear truck configuration only**).

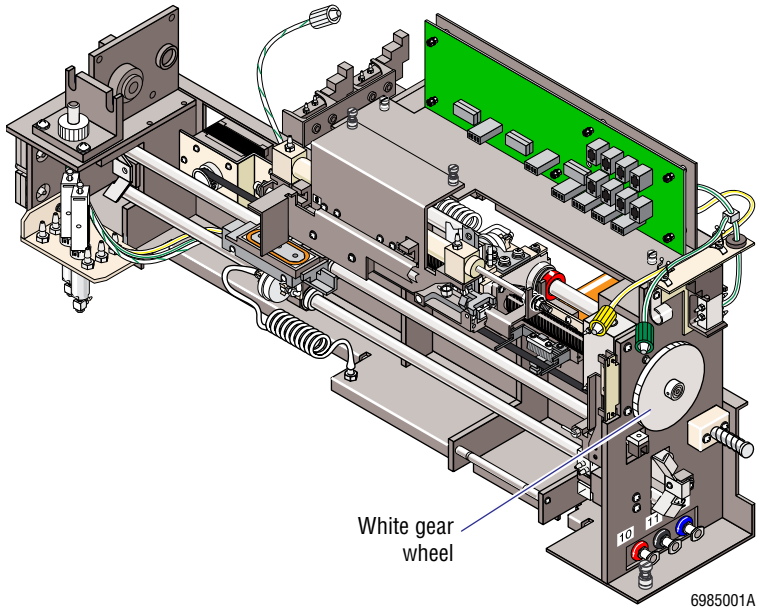
  Note: This adjustment affects the degree of rotation from the horizontal plane along the long edge of the slide.
- Adjust the slide pickup position of the truck (**new smear truck configuration only**).
- Reposition the truck lift sensors, SEN18 and SEN19.

Use this procedure after you have disassembled the smear truck or its associated components to check the alignment of the smear truck assembly, and to adjust the assembly if necessary.

TIP: To more easily access the smear truck adjustment screws, turn the white gear wheel on the right end of the Slide and Smear module (Figure 4.18-1) to manually move the smear truck to a more accessible location.

Clockwise rotation moves the smear truck toward the dispense probe.

Figure 4.18-1 Gear for Manually Moving the Smear Truck



Two configurations of the smear truck assembly are currently in use. Compare Figures 4.18-2 and 4.18-3.

Tools/Supplies Needed

- ❑ Five whole-blood specimens

Figure 4.18-2 Smear Truck Assembly Adjustments, Old Configuration

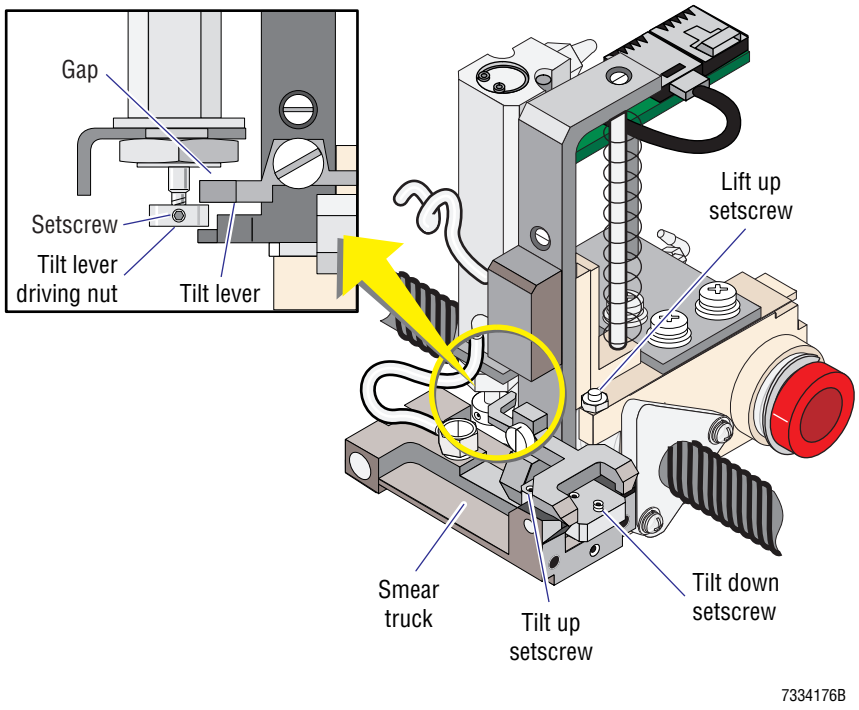
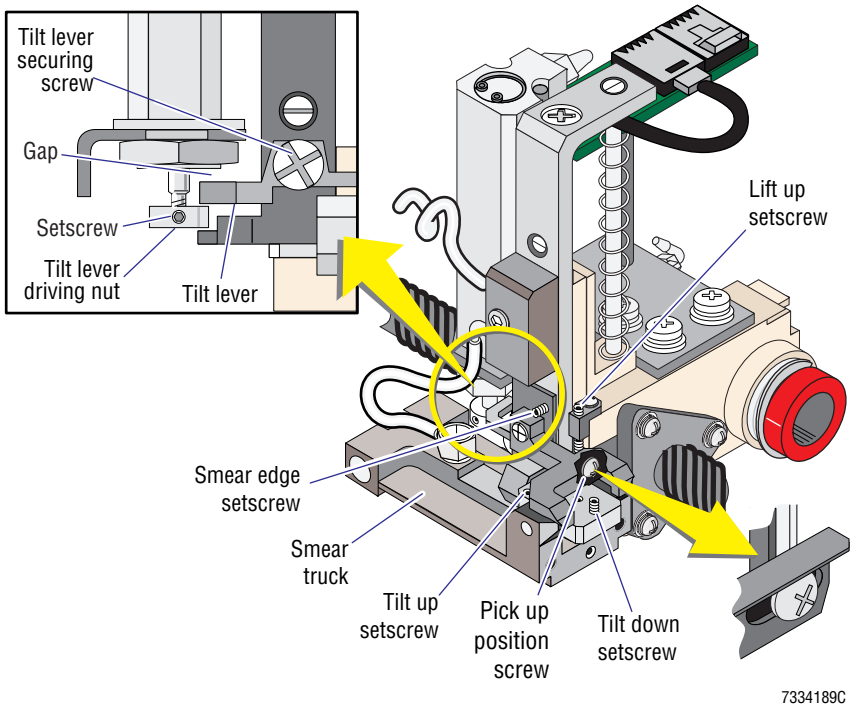


Figure 4.18-3 Smear Truck Assembly Adjustments, New Configuration



Smear Truck Pickup, Tilt, and Sensor Position Adjustments

1. Remove the Cassette Output Queue module to access the smear truck. See the Cassette Output Queue Module removal procedure under Heading 4.1.

2. Ensure the SlideMaker is on, holding the smear truck in the raised, fully horizontal position.
3. Check the position of the tilt lever within the tilt lever driving mechanism and verify the gap between the top of the tilt lever and the cylinder body is about 1 mm (1/32 in.). Refer to Figure 4.18-2 or 4.18-3.

   Note: One millimeter is about the thickness of a glass slide.
4. If the distance between the top of the tilt lever and the cylinder body is not correct, adjust the position of the tilt lever driving nut:
   a. Loosen the setscrew for the tilt lever driving nut. Refer to Figure 4.18-2 or 4.18-3.
   b. Turn the nut until you achieve the correct distance.
   c. Tighten the setscrew.
5. Check the position of the smear truck and verify that it is fully horizontal.
6. If the smear truck is not fully horizontal, adjust the tilt up and lift up setscrews. Refer to Figure 4.18-2 or 4.18-3.
   a. Manually hold the smear truck in contact with the tilt up setscrew and adjust the tilt up setscrew until the smear truck is fully horizontal.
   b. Release the smear truck.
   c. On instruments with the **old smear truck configuration**, loosen the locking nut securing the lift up setscrew.

   ATTENTION: Over-adjusting the lift up setscrew will lower the height of the smear truck.

   d. Adjust the lift up setscrew until the smear truck is fully horizontal and at its maximum height.
   e. Tighten the locking nut (**old smear truck configuration only**).
   f. Check the position of the tilt lever within the tilt lever driving mechanism and verify the gap between the top of the tilt lever and the cylinder body is about 1 mm (1/32 in.). Refer to Figure 4.18-2 or 4.18-3.
   g. If the distance between the top of the tilt lever and the cylinder body is not correct, adjust the position of the tilt lever driving nut. Go back to step 4.
7. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
8. Do several dry cycles, checking the smear truck, and verify:
   a. On instruments with the **new smear truck configuration**, when the smear truck picks up a slide, the slide is centered on the smear truck. If it is not, go to step 9.
   b. When the smear truck drops to the tilted position, the spreader slide lightly touches the slide on the shuttle. If it does not, go to step 10.
   c. As the smear truck moves the spreader slide to the wick position, the spreader slide skims over the surface of the smear slide. If it does not, go to step 10.
   d. If the smear truck meets the critieria in steps a through c, go to step 11.
9. If the slide is not centered on the truck and the smear truck is the new configuration, adjust the pickup position:
   a. Unscrew the tilt lever securing screw and remove the tilt lever. Refer to Figure 4.18-2 or 4.18-3.

b. Completely loosen but do not remove the smear edge setscrew. Refer to Figure 4.18-2 or 4.18-3.

c. Manually rotate the smear truck to access the pickup position screw, and loosen the pickup position screw. Refer to Figure 4.18-2 or 4.18-3.

d. Remove the slide cassette from the Slide Ejector module.

e. Manually lift the smear truck, and using the white gear wheel move the smear truck over the slide on the slide pickup bridge.

f. Move the smear truck in or out to center it on the slide.

g. Screw in the smear edge setscrew being careful not to change the smear truck's position on the slide.

Note: The smear edge setscrew ensures the truck bracket remains parallel to the slide. At the completion of the smear truck adjustments, this setscrew's setting is verified and adjusted if necessary using the Smear Edge Adjustment procedure.

h. Using the white gear wheel, manually move the smear truck off the slide pickup bridge.

i. Manually rotate the smear truck and tighten the pickup position setscrew.

j. Reinstall the tilt lever.

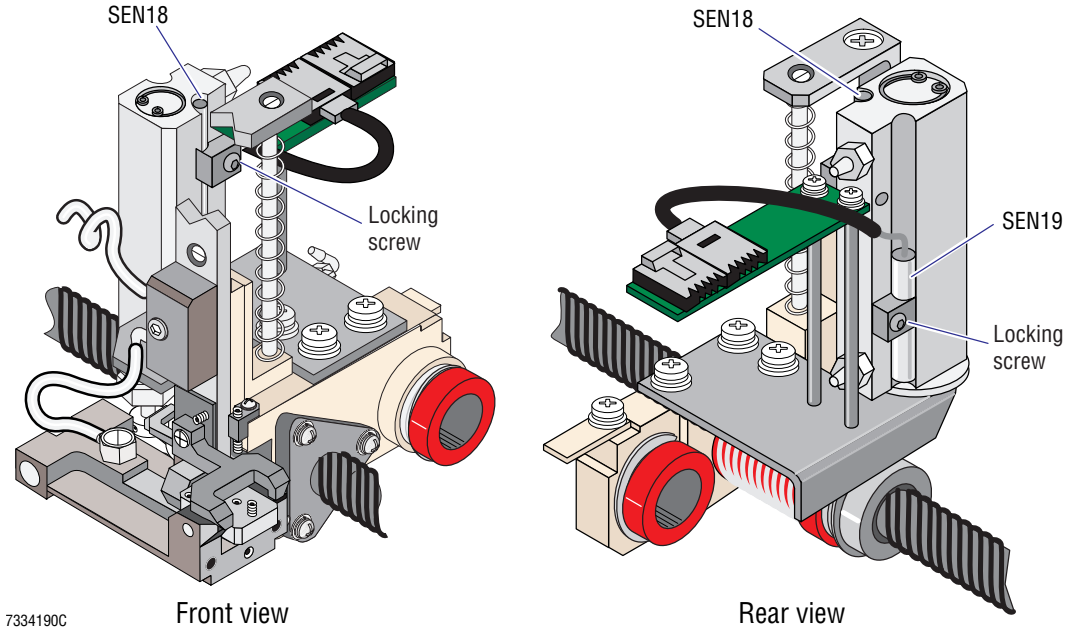
k. Repeat step 8.

10. If the spreader slide hits the slide on the shuttle too hard, or if the spreader slide does not contact the surface of the smear slide, adjust the tilt down setscrew. Refer to Figure 4.18-2 or 4.18-3.
    - Adjust the tilt down setscrew clockwise to reduce the tilt.
    - Adjust the tilt down setscrew counterclockwise to increase the tilt.
11. Check the position of the truck lift sensors, SEN18 and SEN19:
    a. On the SlideMaker screen, select **SCAN SENSOR TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ RUN SERVICE ▸▸ SCAN SENSOR TEST**).
    b. With the smear truck in the raised, fully horizontal position, verify SEN18 is activated and SEN19 is de-activated.

ATTENTION: Two glass slides must be on the shuttle when checking SEN18 and SEN19 with the smear truck in the down, fully horizontal position.

    c. Ensure two glass slides are on the shuttle.
    d. Manually push the smear truck assembly down, all the way to the glass slides on the shuttle, and verify SEN18 is de-activated and SEN19 is activated.
12. If SEN18 or SEN19 is not activated and de-activated correctly, adjust the position of the sensor:
    a. Unfasten the captive screws securing the upper cassette transfer mechanism and set the mechanism aside. Refer to step 4 of the Cassette Output Queue Module removal procedure under Heading 4.1.
    b. Loosen the locking screw for the appropriate sensor. See Figure 4.18-4.
    c. Adjust the sensor as necessary and tighten the locking screw.
    d. Repeat steps b and c until the sensor is activated and de-activated correctly.

Figure 4.18-4 Truck Lift Sensor Locking Screws



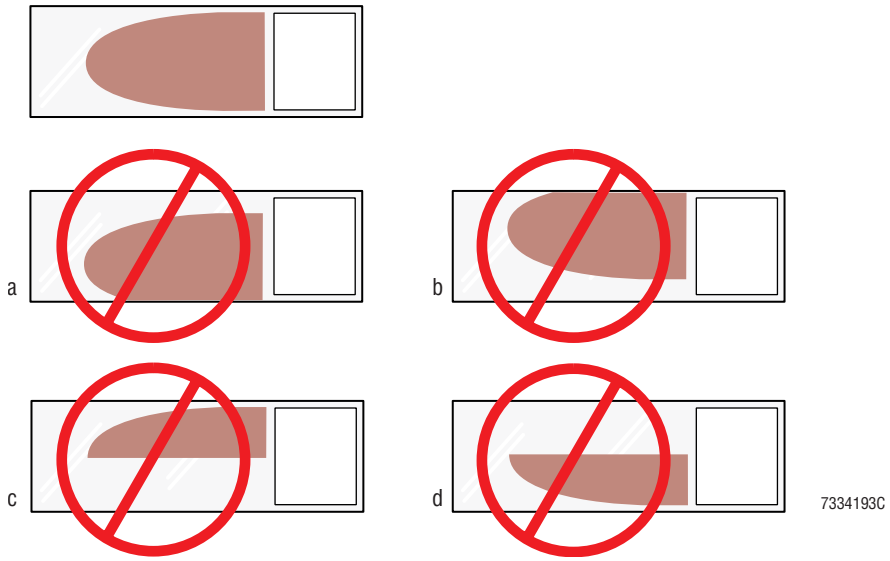
13. Reinstall the upper cassette transport mechanism and the Cassette Output Queue module.
14. Verify the smear truck is operating correctly. Go to Verification.

Verification

1. Ensure the back of the slide cassette does not contact the arm of the upper cassette transfer mechanism.
2. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
3. Do five dry cycles and ensure:
   - The smear truck:
     - Picks up the slide at the Slide Ejector module correctly.
     - Places the slide on the shuttle correctly.
   - No truck vacuum errors occur. If truck vacuum errors occur, repeat steps 5 and 6, the horizontal position checks under Smear Truck Pickup, Tilt, and Sensor Position Adjustments.
4. Run five whole blood cycles and ensure the blood smears are acceptable. See Figure 4.18-5.
   - If the edges of the smear are not centered between the long edges of the slide as shown in Figure 4.18-5 a and b, the slide is not centered on the shuttle. To center the slide on the smear truck so that the slide will be centered on the shuttle:
     - For the **old configuration of the smear truck**, go to Slide Ejector Alignment under Heading 4.15, SLIDE EJECTOR ADJUSTMENTS/ALIGNMENT.
     - For the **new configuration of the smear truck**, go back to step 9 under Smear Truck Pickup, Tilt, and Sensor Position Adjustments.

- If the blood is not wicked completely across the slide as shown in Figure 4.18-5 c and d, the slide is rotated from the horizontal plane along the long edge of the slide. To rotate the slide to the horizontal position, go to Smear Edge Adjustment below.

Figure 4.18-5 Checking the Smears

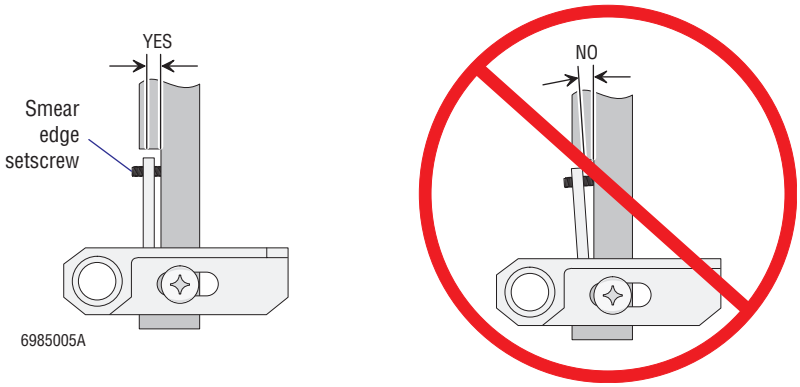


Smear Edge Adjustment

1. If the blood is not fully wicked across the slide as shown in Figure 4.18-5 c and d, adjust the smear edge setscrew.
   a. If the smear looks like Figure 4.18-5 c, tighten the smear edge setscrew.
   b. If the smear looks like Figure 4.18-5 d:
      1) Loosen the smear edge setscrew.
      2) Push on the tilt lever securing screw to close the resulting gap.

      Note: Refer to Figure 4.18-6 for the correct setting of the smear edge setscrew.

Figure 4.18-6 Checking the Smear Edge Setscrew Setting



2. Run five whole blood cycles and check the blood smears. Refer to Figure 4.18-5.
3. Repeats steps 1 and 2 until the blood smears are acceptable.

4.19 SMEAR TRUCK AND SHUTTLE GUIDE RODS CLEANING

Purpose

Use this procedure periodically to remove dirt buildup on the two smear truck and shuttle guide rods.

Tools/Supplies Needed

- ❑ Clean cloth

Procedure

1. Wipe the smear truck and shuttle guide rods with a clean cloth.

CAUTION Damage to bearings. Do not wipe the smear truck and shuttle guide rods with Teflon® or silicone sprays/lubricants, such as WD-40® lubricant. Use water to remove stubborn dirt buildup.

2. If the guide rods are still dirty, dampen the cloth with water and wipe the guide rods with the damp cloth.

4.20 SMEAR TRUCK AND SHUTTLE O-RING REPLACEMENT

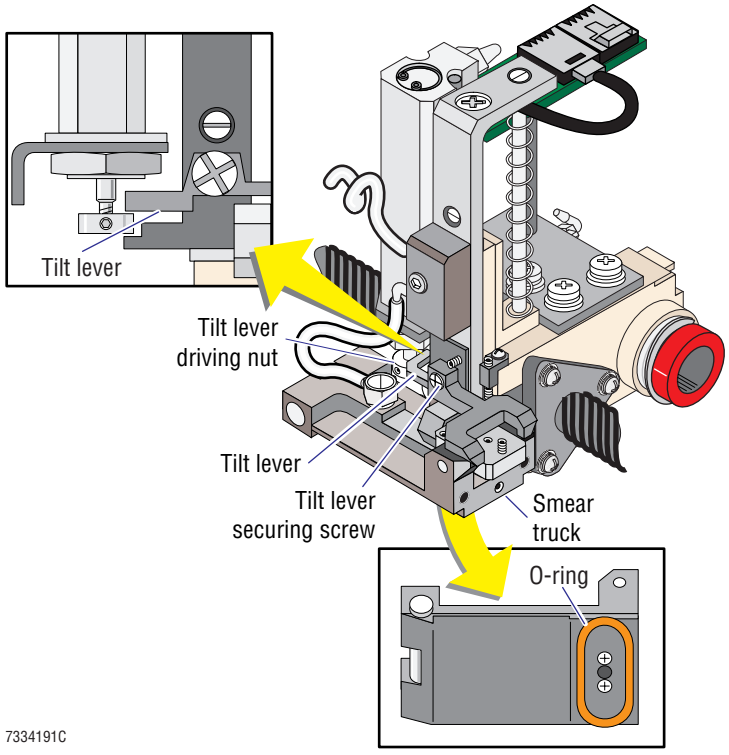
Purpose

Use these procedure to reinstall dislodged O-rings, or to replace damaged O-rings, in the smear truck or the shuttle.

Smear Truck O-Ring Installation

1. Remove the Cassette Output Queue module to access the smear truck. See the Cassette Output Queue Module removal procedure under Heading 4.1.
2. Unscrew the tilt lever securing screw and remove the tilt lever. See Figure 4.20-1.

Figure 4.20-1 Tilt Locking Lever Location and Locking Screw Assembly



3. Tilt the smear truck toward you.
4. If an O-ring is in place but damaged, remove the O-ring.
5. Install the new or dislodged O-ring.
6. Reinstall the tilt lever, ensuring the tilt lever is located correctly in the tilt lever driving nut mechanism as shown in Figure 4.20-1.

   Note: For ease of replacement, on the SlideMaker screen select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)** and energize SOL61, releasing the pressure on the truck lift mechanism.
7. Reinstall the Cassette Output Queue module.
8. Ensure the smear truck picks up and deposits the slides correctly. Go to Verification.

Shuttle O-Ring Installation

1. Remove the Cassette Output Queue module to access the shuttle. See the Cassette Output Queue Module removal procedure under Heading 4.1.
2. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)**.
3. De-energize SOL44 to disable the shuttle vacuum.
4. Remove the slide from the shuttle.
5. If an O-ring (vacuum chuck) is in place but damaged, remove the O-ring.
6. Install the new or dislodged O-ring.
7. Run a flat-blade screwdriver around the entire perimeter of the O-ring to ensure a good vacuum seal.
8. Reinstall the Cassette Output Queue module.
9. Ensure the O-ring (vacuum chuck) makes a good seal between the slide and the shuttle. Go to Verification.

Verification

1. On the SlideSmaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. If you installed an O-ring in the smear truck, do five dry cycles and ensure:
   - The smear truck:
     - Picks up the slide from the Slide Ejector module correctly.
     - Places the slide on the shuttle correctly.
   - No truck vacuum errors occur. If truck vacuum errors occur, repeat Smear Truck O-Ring Installation.
3. If you installed an O-ring in the shuttle, do five dry cycles and ensure no shuttle vacuum errors occur. If shuttle vacuum errors occur, repeat Shuttle O-Ring Installation.

4.21 TOP-OF-FORM SENSOR CHECKS AND ADJUSTMENTS

Purpose

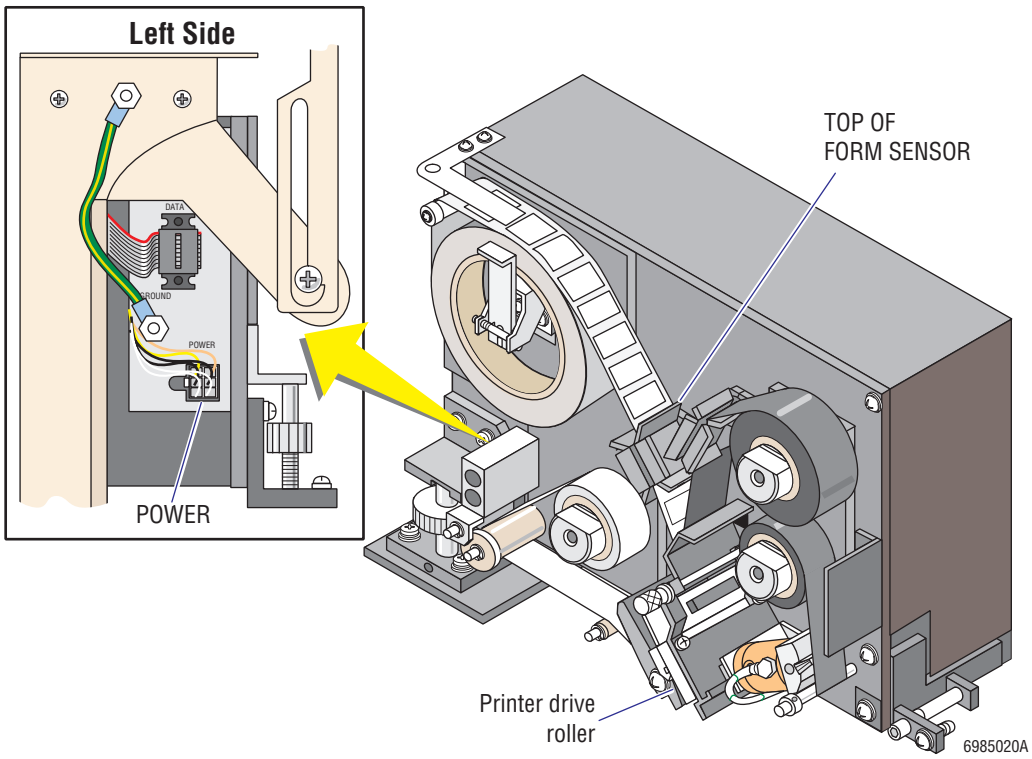
Use this procedure to check the top-of-form sensor, and to adjust the sensor if necessary, whenever the label printer cannot find the top of the label. Possible symptoms include:

- The printer prints too high or too low on the labels.
- After a label is printed, the next label is protruding from the printhead.
- The SlideMaker generates a printer error message after printing three or four consecutive labels.

Procedure

1. Using a flashlight, check the top of form sensor and the printer drive roller (Figure 4.21-1) for stuck labels.
   a. If labels are stuck in the top of form sensor:
      1) Remove the labels.
      2) Verify the printer is working correctly. Go to Verification.
   b. If labels are stuck on the printer drive roller, clean the printer drive roller and the printhead. Go to Heading 4.12, PRINTHEAD CLEANING.

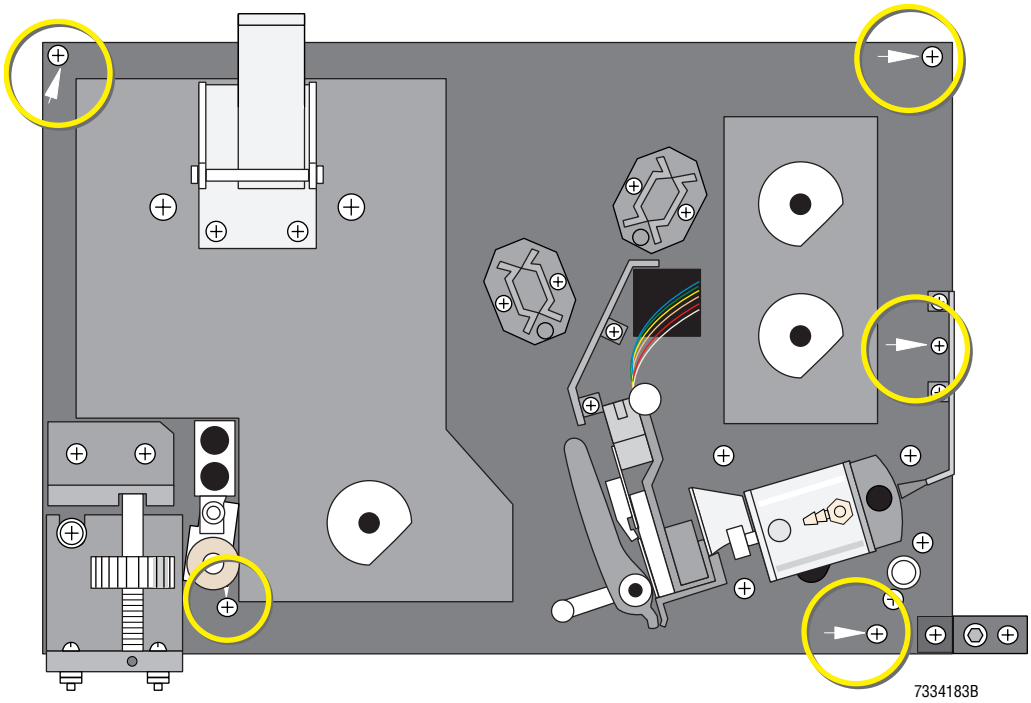
Figure 4.21-1 Label Printer Module, Front and Left Side Views



2. Remove the Label Printer module from the SlideMaker. See the Label Printer Module removal procedure under Heading 4.1.

3. Remove the five screws securing the Label Printer module cover and remove the cover. See Figure 4.21-2.

Figure 4.21-2 Label Printer Module Securing Screws

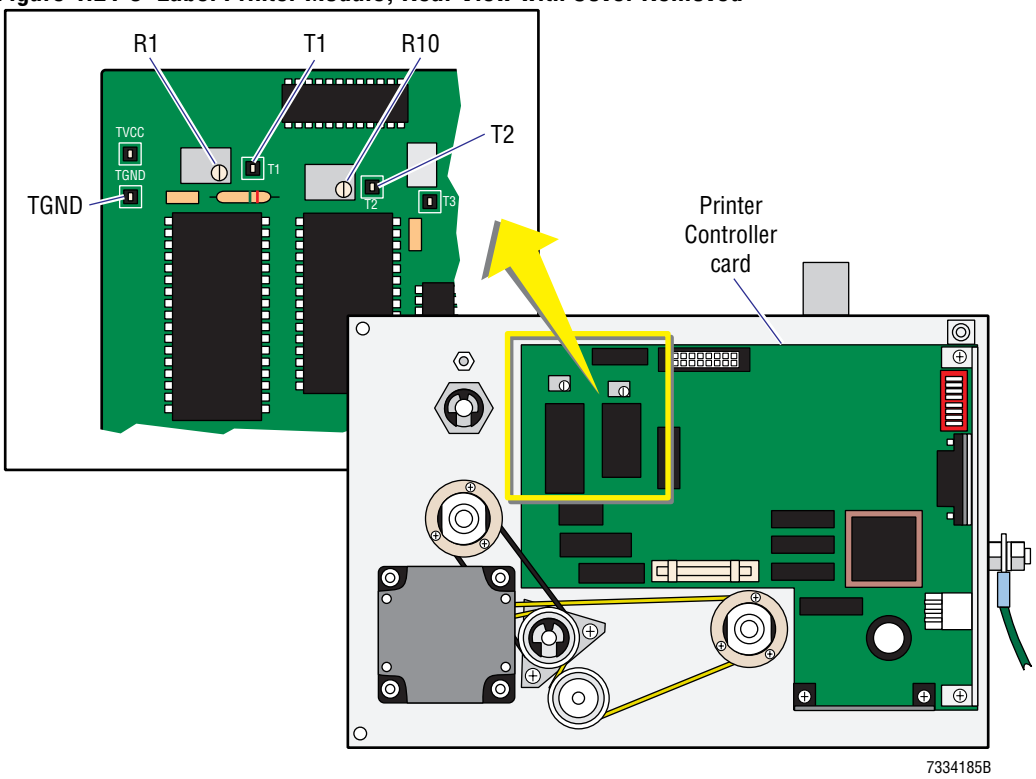


4. Position the Label Printer module so that it is close enough for you to reconnect its power cable to the SlideMaker (Figure 4.21-1), but it will not damage any SlideMaker components or fall over.
5. Unclamp the cable clamp holding the printer power cable to the frame of the SlideMaker.

WARNING Risk of personal injury. Contacting exposed electronic components while the Label Printer module is uncovered and attached to power can cause electric shock. Avoid handling the components inside the uncovered Label Printer module when the module is attached to power.

6. Reconnect the printer power cable to the Label Printer module and power up the SlideMaker.
7. Manually advance the label roll until a label is blocking the top of form sensor.
8. Measure the voltage at T2 on the Printer Controller card. See Figure 4.21-3. Connect the ground probe to TGND.
9. Verify the voltage at T2 is within the acceptable limits specified for T2 in Table A.1-1, Top of Form Sensor Voltage Settings. If it is not, adjust R10 as necessary to obtain this value.
10. Measure the voltage at T1 on the Printer Controller card and verify the voltage is within the acceptable limit specified for T1 (with a **label** blocking the sensor) in Table A.1-1, Top of Form Sensor Voltage Settings. If it is not, adjust R1 as necessary to obtain this value.

Figure 4.21-3 Label Printer Module, Rear View with Cover Removed



11. Manually advance the label roll until only the label liner is blocking the top of form sensor.
12. Measure the voltage at T1 and verify the voltage is within the acceptable limit specified for T1 (with the **label liner** blocking the sensor) in Table A.1-1, Top of Form Sensor Voltage Settings. If it is not, adjust R1 as necessary to obtain this value.
13. Manually advance the label roll until a label is blocking the top of form sensor again.
14. Repeat from step 10, adjusting R1 as necessary, until the value is within acceptable limits both when the label is blocking the sensor and when the liner is blocking the sensor.
15. Power down the SlideMaker.
16. Disconnect the printer power cable from the Label Printer module and reinstall the cable in the cable clamp on the SlideMaker frame.
17. Reinstall the Label Printer module's cover.
18. Reinstall the Label Printer module in the SlideMaker, connecting its cables, ground wire, and tubing.
19. Power up the SlideMaker.
20. Ensure the printer is printing labels correctly. Go to Verification.

Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do 10 dry cycles and ensure:
   - The printing on the labels is in the correct position.
   - The SlideMaker does not generate any printer error messages.

4.22 Z-AXIS REGISTER SUBASSEMBLY COMPONENT REPLACEMENT

Purpose

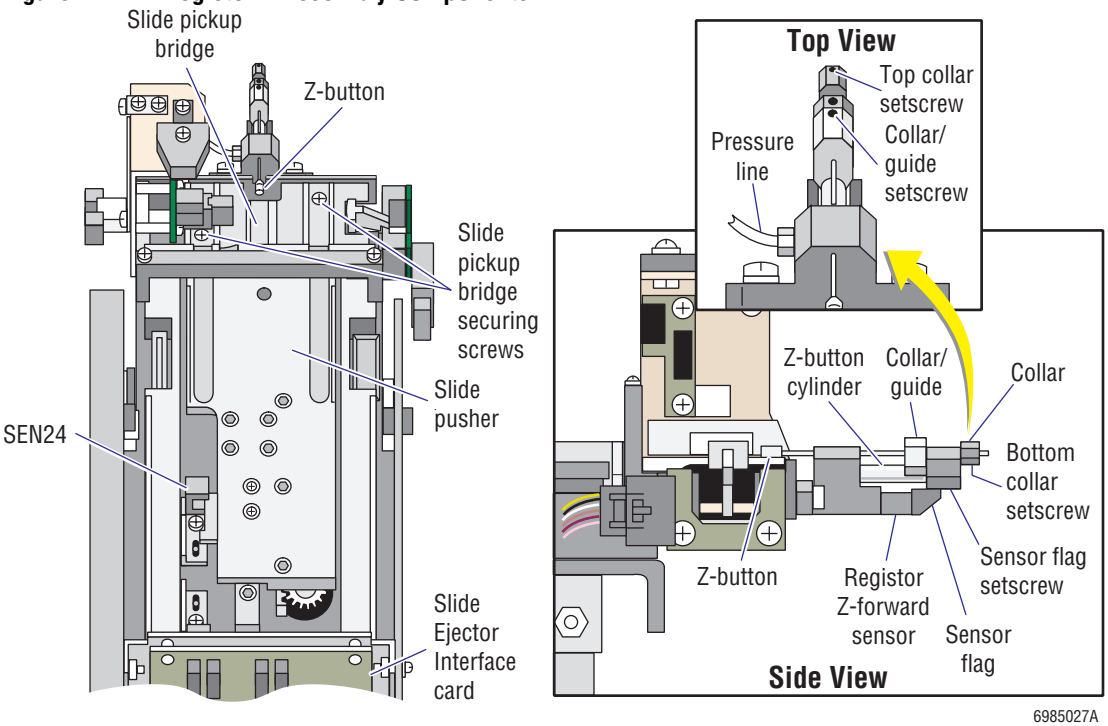
Use this procedure to replace any of the following components in the register-Z assembly:

- Register Z-forward sensor
- Register Z-forward sensor flag
- Z-button
- Z-button cylinder

Procedure

1. Remove the Slide Ejector module. Refer to Cassette Transport Module under Accessing the Main Compartments in the SlideMaker in Heading 4.1.
2. Remove the register Z-forward sensor flag to replace the flag or to access the Z-button, the register Z-forward sensor, or the Z-button cylinder:
   a. Loosen the two setscrews securing the top and bottom of the collar and slide the collar off the Z-button. See Figure 4.22-1.
   b. Loosen the setscrew in the bottom of the sensor flag and slide the flag off the Z-button and the shaft of the Z-button cylinder.
   c. Loosen the setscrew securing the collar/guide and slide the collar/guide off the Z-button and the Z-button cylinder.
   d. To replace the sensor flag only, go to step 8. To replace the Z-button, go to step 3. To replace the register Z-forward sensor or the Z-button cylinder, go to step 4.

Figure 4.22-1 Register Z-Assembly Components



3. Replace the Z-button:
   a. Remove the two screws securing the slide pickup bridge. See Figure 4.22-1.
   b. Remove the bridge.
   c. Push out the Z-button.
   d. Install the new Z-button.
   e. Reinstall the slide pickup bridge.
   f. If you are also replacing the register Z-forward sensor or the Z-button cylinder, go to step 4. If not, go to step 8.
4. Remove the register Z-forward sensor to replace the sensor or to access the Z-button cylinder:
   a. Remove the screw securing the register Z-forward sensor. See Figure 4.22-1.
   b. If you are replacing the Z-button cylinder, set the sensor aside and go to step 5.
   c. If you are only replacing the register-Z forward sensor, go to step 6.
5. Replace the Z-button cylinder:
   a. Disconnect the pressure line from the Z-button cylinder. See Figure 4.22-1.
   b. With a needle nose pliers, unscrew the cylinder and remove it.
   c. Screw in the new cylinder and connect the pressure line.
   d. If you are also replacing the register Z-forward sensor, go to step 6. If not, go to step 7.
6. Disconnect the register Z-forward sensor from the Slide Ejector Interface card (Figure 4.22-1) and remove the sensor.
7. Install the register Z-forward sensor, being careful not to pinch any wires. If this is a new sensor, connect the sensor to the Slide Ejector Interface card.
8. Install the register-Z forward sensor flag:
   a. Slide the collar/guide onto the Z-button and its cylinder, and push the collar/guide as far toward the slide pickup bridge as possible. DO NOT tighten the setscrew.
   b. Slide the sensor flag onto the Z-button and its cylinder shaft, and push the flag as far toward the slide pickup bridge as possible.
   c. Tighten the setscrew on the bottom of the sensor flag.
   d. Manually hold the Z-button against the slide pickup bridge, and slide the collar/guide until it just touches the sensor flag.
   e. Tighten the setscrew for the collar/guide.
   f. Slide the collar onto the Z-button until it just touches the sensor flag.
   g. Tighten the two setscrews for the collar.
9. Reinstall the Slide Ejector module.
10. Ensure the register Z-assembly is working correctly. Go to Verification.

Verification

On the SlideMaker screen, select **DRY CYCLE (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and ensure the smear truck picks up the slide.

4.23 SEN46 (GRIPPER OVEREXTENDED SENSOR) ALIGNMENT AND FLAG REPLACEMENT

Purpose

This section contains two procedures.

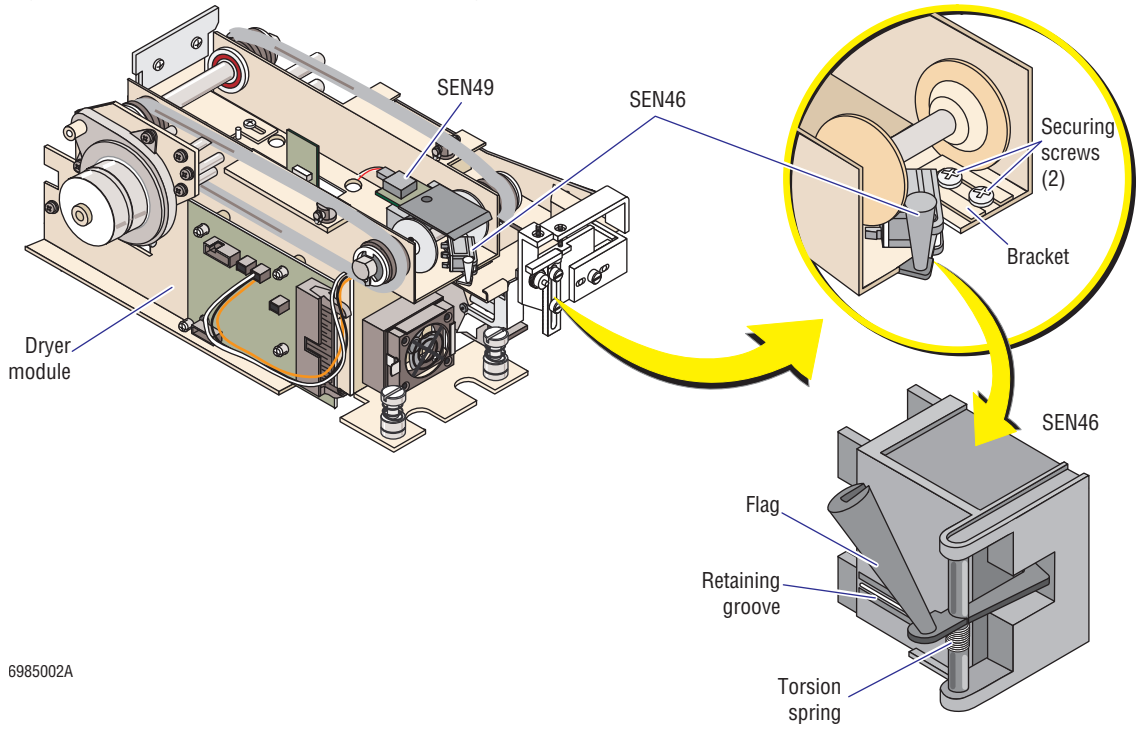
- Use the SEN46 Alignment procedure whenever you have:
  - Replaced SEN46 or its flag.
  - Adjusted the Slide Elevator module.
- Use the SEN46 Flag Replacement procedure to replace a broken flag.

SEN46 Alignment

Procedure

1. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST).**
2. De-energize SOL60 to close the gripper on the platen.
3. Select **SENSOR STATUS** (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**).
4. Verify SEN46 is inactive. If the sensor is active the flag is out of the sensor and the sensor needs to be adjusted. Go to step 9.
5. Carefully place a glass slide on the platen, ensuring the gripper secures the slide.
6. Verify SEN46 is active. If the sensor is inactive the flag is still in the sensor and the sensor needs to be adjusted. Go to step 9.
7. Select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST)** and energize SOL60 to open the gripper.
8. Select **SENSOR STATUS** (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**) and verify SEN46 is still active. If it is, SEN46 does not require adjustment.
9. To adjust SEN46:
   a. Remove the Cassette Output Queue module to access the gripper overextended sensor, SEN46. See the Cassette Output Queue Module removal procedure under Heading 4.1.
   b. Slide back the dryer exit sensor, SEN49, to access the bracket for SEN46. See Figure 4.23-1.
   c. Loosen the two cross-head screws securing the SEN46 bracket to the Dryer module. See Figure 4.23-1.
   d. Move the SEN46 bracket until the sensor's flag just contacts the gripper.
   e. Tighten the bracket's securing screws.
   f. Repeat from step 1 above until SEN46 is adjusted correctly.
   g. Reinstall SEN49.
   h. Reinstall the Cassette Output Queue module.

Figure 4.23-1 SEN46 with Bracket and Flag Detail



Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do five dry cycles and ensure the platen operates correctly.

SEN46 Flag Replacement

Tools/Supplies Needed

- ❑ A pointed object such as a ball-point pen

Removal

1. Move the slide elevator platen to access the flag for SEN46:
   a. Select **BASKET TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ BASKET TEST**).
   b. Set **POSITION** to **SINGLE**.
   c. Select **ELEVATOR** to move the slide elevator down.
   d. While the slide elevator is moving down, select **STOP MOTION.** The slide elevator stops when it reaches the bottom limit of its travel, holding the platen in the veritcal position.

      Note: If you do not select **STOP MOTION,** the slide elevator completes its downward travel and immediately begins its upward travel.
2. If the dryer exit sensor, SEN49, is covering the flag for the gripper overextended sensor, SEN46, slide SEN49 back out of the way.

3. Before removing the flag, note the placement of its torsion spring. The torsion spring leg is positioned in a retaining groove on the sensor's body. Refer to Figure 4.23-1.
4. Manually move the flag toward the Dryer module and hold its position.
5. At the location where the flag attaches to the sensor body, press down on the top nipple of the flag with a pointed object to disengage the flag from the sensor body, and remove the flag.

Installation

1. At the sensor body, position the leg of the flag's torsion spring in its retaining groove and the bottom nipple of the flag in its retaining hole, and push in the flag until its top nipple engages with the sensor body.
2. Manually move the flag toward the Dryer module and then release it to verify correct spring action.
3. Select **ELEVATOR** to move the slide elevator up.
4. While the slide elevator is moving up, select **STOP MOTION**. The slide elevator stops when it reaches the top limit of its travel.
5. If you removed SEN49, reinstall it.
6. Verify the platen is working correctly. Go to Verification below.

Verification

1. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do five dry cycles and ensure the platen functions correctly.

4.24 ENCODER REPLACEMENT

Purpose

Use this procedure to replace the encoder when the SlideMaker is generating excessive:

- Truck position errors related to the left/right movement of the truck.
- Excessive SEN58, SEN59, or SEN60 errors.

Tools/Supplies Needed

❑ 0.035-in. Allen wrench, PN 5402022

Note: An Allen wrench is shipped with each encoder.

Preliminary Checks

Before replacing the encoder, do these checks to help ascertain the encoder is the problem.

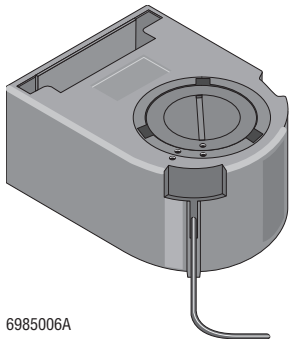
1. Using the white gear wheel on the right end of the Slide and Smear module, move the truck through its entire length of travel, verifying the movement is smooth and unobstructed.
2. On the SlideMaker screen, select **SENSOR STATUS** (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**).
3. Using the white gear wheel, move the truck very slowly while monitoring SEN58, SEN59, and SEN60.

   Note: When operating correctly, SEN58 and SEN59 are activated and de-activated very rapidly. SEN60, on the other hand, is only activated once throughout the entire length of travel and it is easy to miss it.
4. If the encoder appears to be defective, or if you are unable to eliminate the encoder as the cause of the problem, go to the Removal procedure below.

ATTENTION: The new encoder is shipped with the Allen wrench already positioned in the setscrew that secures the collar to the lead screw as shown in Figure 4.24-1.

If you need to use the Allen wrench to remove the old encoder, it is strongly recommended that you refit the Allen wrench into the setscrew of the new encoder before installing it.

Figure 4.24-1 Encoder Configuration at Shipment

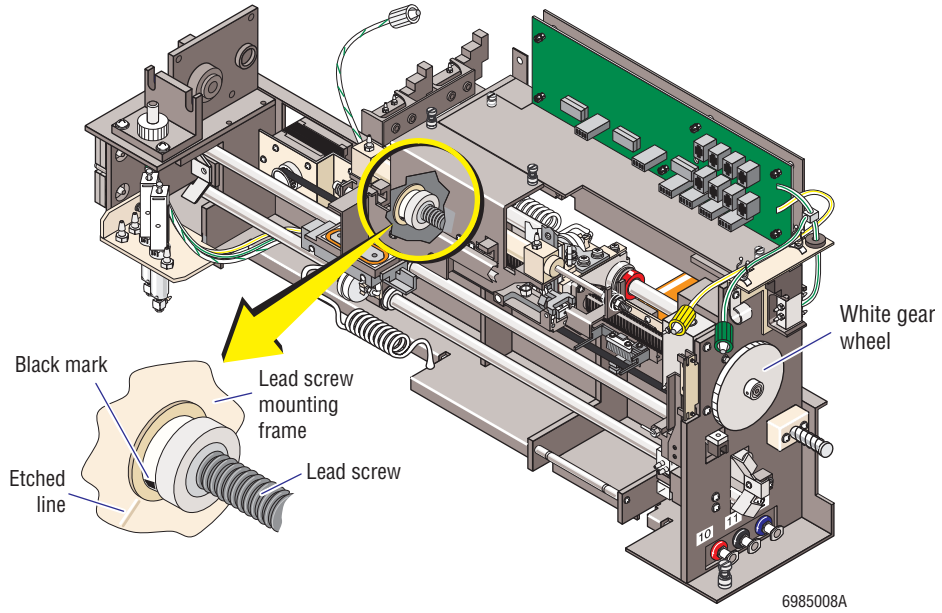


Removal

1. Power down the SlideMaker and remove the Label Printer and Slide Ejector modules to access the encoder. See Label Printer Module and Cassette Transport Module removal procedures under Heading 4.1.

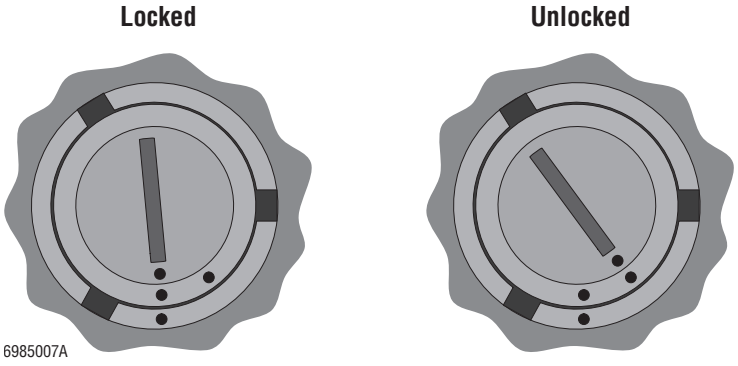
2. Using the white gear wheel, align the black mark on the lead screw with the etched line on the lead screw mounting frame as shown in Figure 4.24-2.

Figure 4.24-2 Positioning the Lead Screw for Encoder Replacement



3. Using a flat-blade screwdriver, turn the encoder from locked to unlocked. See Figure 4.24-3.

Figure 4.24-3 Locked and Unlocked Positions of the Encoder



4. Insert the Allen wrench into the encoder's access hole for the collar setscrew and loosen the setscrew.

CAUTION The encoder base is a factory set component and cannot be replaced in the field. When replacing the encoder, only remove and replace the encoder body. DO NOT, under any circumstances, remove the encoder base from the frame of the Slide and Smear module.

5. Carefully pry the encoder body from the encoder base.
6. Disconnect the cable from the rear of the encoder.

Installation

1. If an encoder base was shipped with the new encoder, remove the base from the body and discard the base.
2. If you removed the Allen wrench from the new encoder, reinstall it. Insert the Allen wrench through the new encoder's access hole for the collar setscrew and ensure it engages with the setscrew.
3. Holding the Allen wrench in place, carefully install the encoder body onto the encoder base.
4. Ensure the mark on the lead screw is still aligned with the etched line on the lead screw mounting frame.
5. Tighten the collar setscrew, securing the encoder to the lead screw.
6. Remove the Allen wrench from the encoder.
7. Turn the encoder to the locked position. Refer to Figure 4.24-3.
8. Connect the cable to the rear of the encoder.
9. Reinstall the Slide Ejector module and the Label Printer module.

Verification

1. Power up the SlideMaker and verify the SlideMaker resets without generating any truck position errors.
2. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
3. Do five dry cycles and ensure no truck position errors occur.

4.25 BASKET QUEUE MODULE CHECKS AND ADJUSTMENTS

Purpose

Use this procedure to ensure:

- The front and rear belts in the Basket Queue module are operating correctly.
- The front and rear belt motors and sensors are aligned correctly.

Tools/Supplies Needed

- ❑ LOCTITE® 222 thread lock, PN 1601065
- ❑ A set of metric Allen wrenches

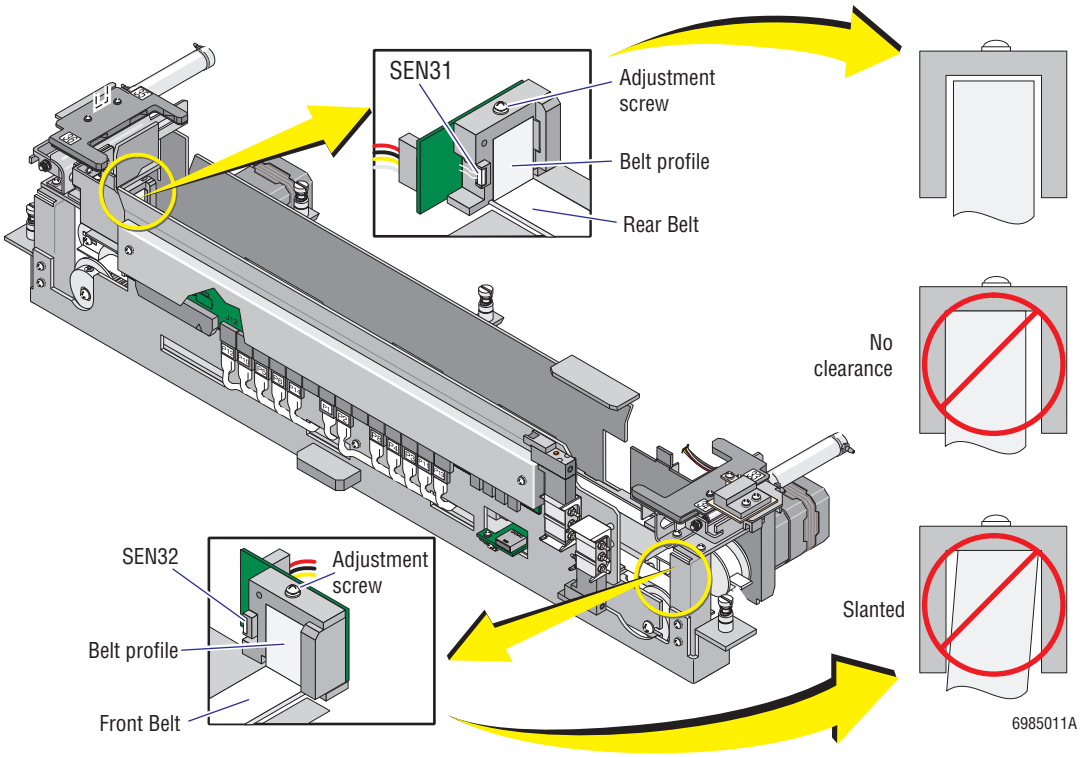
Preliminary Checks

1. Remove all slide baskets from the front and rear tracks of the Basket Queue module.
2. Manually move the front and rear belts by gripping a profile (basket pusher) and pulling the belt left and right, to verify the resistance to movement is even.

   Note: Uneven resistance (slack in the motion) can be caused by loose screws on the drive pulleys or the pulley drive coupling.
3. On the SlideMaker screen, select **BASKET TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ BASKET TEST**).
4. Set **POSITION** to **CONTINUOUS**.
5. Select **FRONT/REAR BELT** to move the the belts in the Basket Queue module.
6. As the belts advance, visually monitor the travel of the profiles through the belt position sensors, SEN31 and SEN32. See Figure 4.25-1.
7. Verify the profiles clear the sensors without interference, and that the profiles are straight, not slanted. For examples, see Figure 4.25-1.

   Note: Insufficient clearance between the profiles and the belt position sensors, or slanted profiles, can be caused by a misadjusted belt and/or belt position sensor.
8. Select **STOP MOTION** to stop the belt movment.
9. If both belts passed the criteria in step 2 and step 7, no further adjustment is needed.
10. If either belt failed the criteria in step 2 or in step 7, do all of the Pulley/Motor/Coupling/Position Sensor Adjustment Procedures below.

Figure 4.25-1 Movement of the Profiles (Basket Pushers) through the Belt Position Sensors



Pulley/Motor/Coupling/Position Sensor Adjustment Procedures

ATTENTION: For greater clarity, these adjustments have been divided into several smaller procedures. Do them in the order presented and do not skip any.

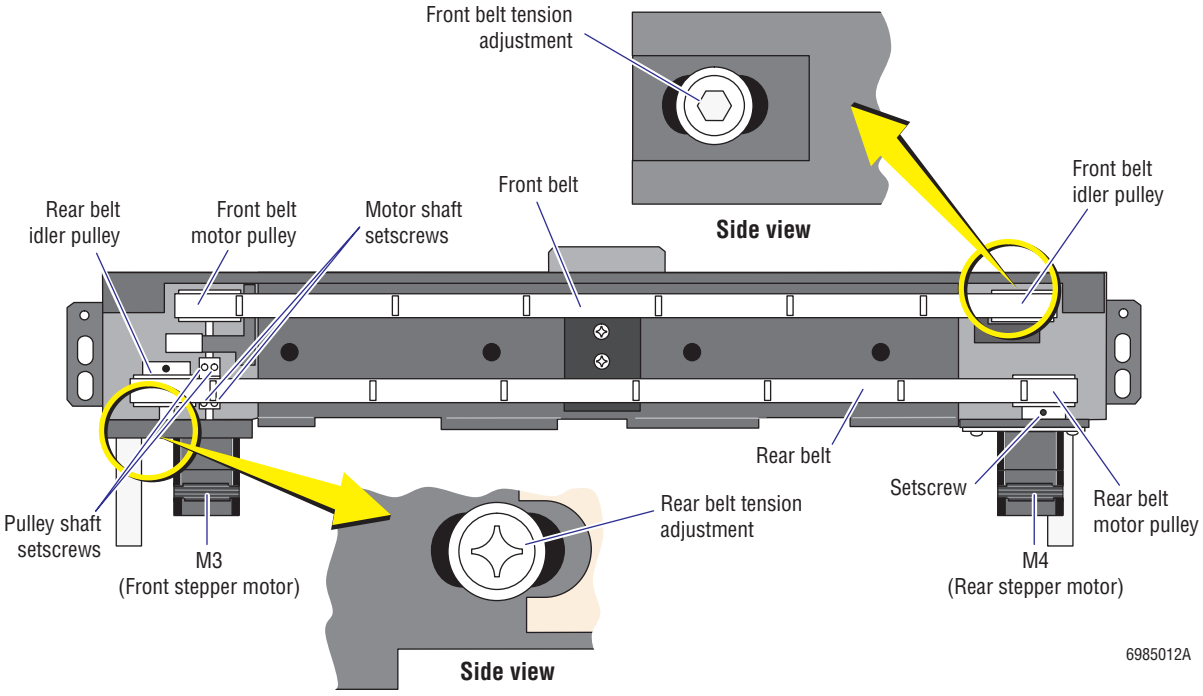
Preliminary

Power off the SlideMaker and remove the Basket Queue module to access the pulley and coupling adjustments. See the Basket Queue Module removal procedure under Heading 4.1.

Rear Belt

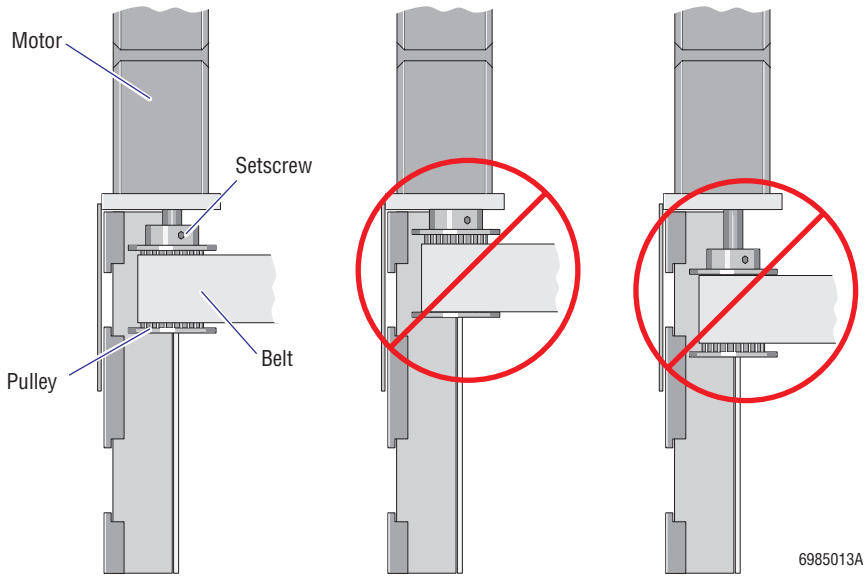
1. Turn the Basket Queue module over.
2. Loosen the setscrew on the motor pulley for the rear belt. See Figure 4.25-2.

Figure 4.25-2 Basket Queue Module (Bottom View) Pulley, Motor, and Coupling Adjustments



3. Manually move the rear belt (by gripping a profile) and adjust the position of the motor pulley until the belt is centered on the pulley as shown in Figure 4.25-3.

Figure 4.25-3 Centering the Belt on the Motor Pulley



4. Apply LOCTITE thread lock to the setscrew on the motor pulley and tighten the setscrew, ensuring the setscrew is engaged on the flat edge of the motor shaft.
5. Turn the Basket Queue module right side up and adjust the rear belt position sensor, SEN31.
    a. Manually move the rear belt (by gripping a profile) until a profile is positioned inside SEN31.
    b. Loosen the sensor adjustment screw. Refer to Figure 4.25-1.
    c. Move the sensor until there is clearance between the sensor and the outer edges of the profile as shown in Figure 4.25-1.
    d. Tighten the adjustment screw.

Front Belt

1. Turn the Basket Queue module over.
2. Using a metric Allen wrench, loosen the two pulley shaft setscrews (Figure 4.25-2) securing the coupling to the motor pulley shaft for the front belt.
3. Remove the two motor securing screws (Figure 4.25-2), and remove the motor with the coupling attached to the shaft.
4. Using a metric Allen wrench, loosen the two motor shaft setscrews (Figure 4.25-2) securing the coupling to the motor shaft.
5. Ensure the coupling is pushed fully onto the motor shaft and retighten the motor shaft setscrews.
6. Reposition the motor and coupling in the Basket Queue module and reinstall the motor securing screws.
7. Center the front belt on the motor pulley and tighten the pulley shaft setscrews.
8. Manually move the front belt (by gripping a profile) and verify the belt is centered on the motor pulley.
9. If the front belt is not centered on the motor pulley, loosen the coupling to pulley setscrews and repeat from step 7.
10. Turn the Basket Queue module right side up and adjust the front belt position sensor, SEN31.
    a. Manually move the front belt (by gripping a profile) until a profile is positioned inside SEN32.
    b. Loosen the sensor adjustment screw. Refer to Figure 4.25-1.
    c. Move the sensor until there is clearance between the sensor and the outer edges of the profile as shown in Figure 4.25-1.
    d. Tighten the adjustment screw.

Belt Tension

1. Loosen the adjustment screw in the front belt idler pulley. Refer to Figure 4.25-2.

CAUTION Overtightening a belt can break the belt or overload the motor. When adjusting the belt tension, remove the slack in the belt but DO NOT overtighten the belt.

2. Adjust the position of the pulley until the front belt is just taut. Do not overtighten the belt.
3. Tighten the adjustment screw.
4. Repeat from step 1 for the rear belt.

Verification

1. Reinstall the Basket Queue module, place a slide basket in the Basket Queue module, and power up the SlideMaker.

   Note: If you turn on the SlideMaker without a slide basket in the Basket Queue module, the SlideMaker generates slide basket errors.
2. Repeat the Preliminary Checks to verify the front and rear belts and position sensors are adjusted correctly. Repeat the adjustments if necessary.
3. Install three empty slide baskets randomly on the front belt in the Basket Queue module, and three on the rear belt.
4. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
5. Do five dry cycles and ensure the slide basket under the Slide Elevator module advances correctly.
6. On the SlideMaker screen, select **ADVANCE BASKET** (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**) and ensure:
   - The slide basket under the Slide Elevator module transfers smoothly to the front belt.
   - The slide basket in the left corner of the front belt transfers smoothly from the front belt to the rear belt.

4.26 SEN37 (BASKET INDEX SENSOR) REPLACEMENT

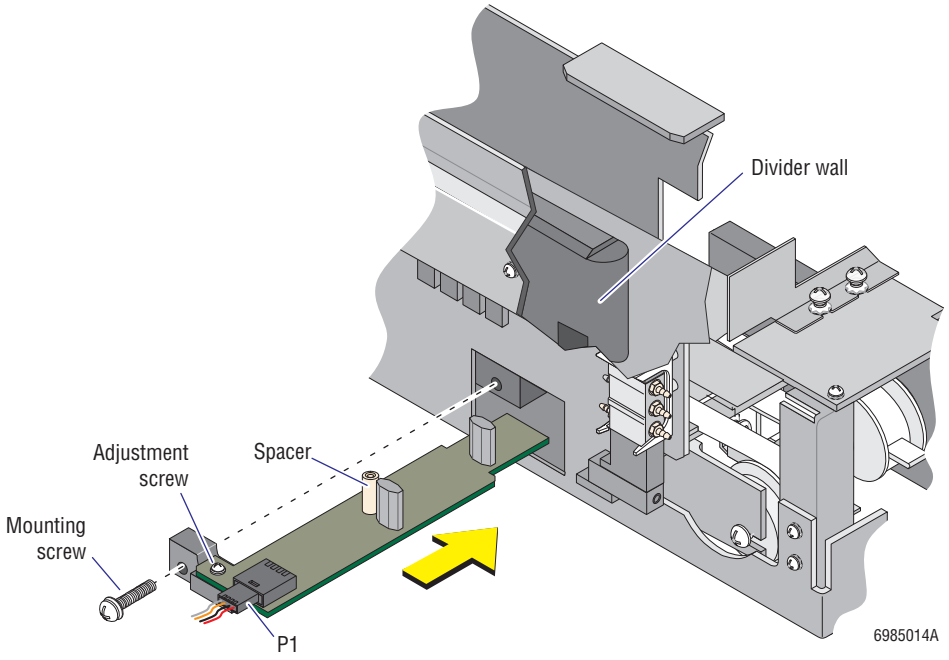
Purpose

Use this procedure to replace a defective basket index sensor, SEN37.

Removal

1. Turn off the main power switch on the rear of the SlideMaker and unplug the main power cable from the ac outlet.
2. Disconnect cable P1 from SEN37.
3. Remove the mounting bracket securing screw. See Figure 4.26-1.

Figure 4.26-1 Removing SEN37



4. Lower and carefully pull the SEN37 assembly out of the Basket Queue module.

Installation

1. Carefully insert the new SEN37 assembly into its slot in the Basket Queue module until the spacer on the assembly clears the center hole between the front and rear tracks.
2. Evenly lift the sensor assembly to the top of the slot.
3. While supporting the sensor assembly, align the pins on the left side of the mounting bracket with their retaining holes in the Basket Queue module, and insert the pins into the holes.
4. Install the mounting bracket screw.

5. Adjust the position of the SEN37 circuit card as necessary.
   a. Loosen the circuit card adjustment screw. Refer to Figure 4.26-1.
   b. Move the card until the spacer is located centrally in the divider wall between the front and rear tracks and does not protrude from either side.
   c. Tighten the adjustment screw.
6. Reconnect cable P1.
7. Plug in the main power cable and turn on the SlideMaker.
8. Verify the SlideMaker is working correctly. Go to Verification.

Verification

1. Verify SEN41 is aligned with SEN37. See Heading 4.11, SEN41 (VERTICAL SLIDE SENSOR) ALIGNMENT.
2. On the SlideMaker screen, select **DRY CYCLE** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
3. Do five dry cycles and ensure the platen releases the slide into the slide basket correctly.

4.27 30 PSI SUPPLY CHECKS AND TRANSDUCER ADJUSTMENT

Purpose

Use this procedure to check the 30 psi supply, and to adjust the transducer on the Pneumatic Supply Monitor, 30 PSI card if necessary, whenever:

- The 30 psi reading on the SlideMaker is low.
- The SlideMaker has unexplained lockups.
- The SlideMaker generates 30 psi out-of-range error messages.
- The 30 psi transducer is not calibrated correctly.
- The Pneumatic Supply Monitor, 30 Psi card is replaced.

Tools/Supplies Needed

- ❑ Digital pressure meter, such as a Marsh meter, PN 2906639

Procedure

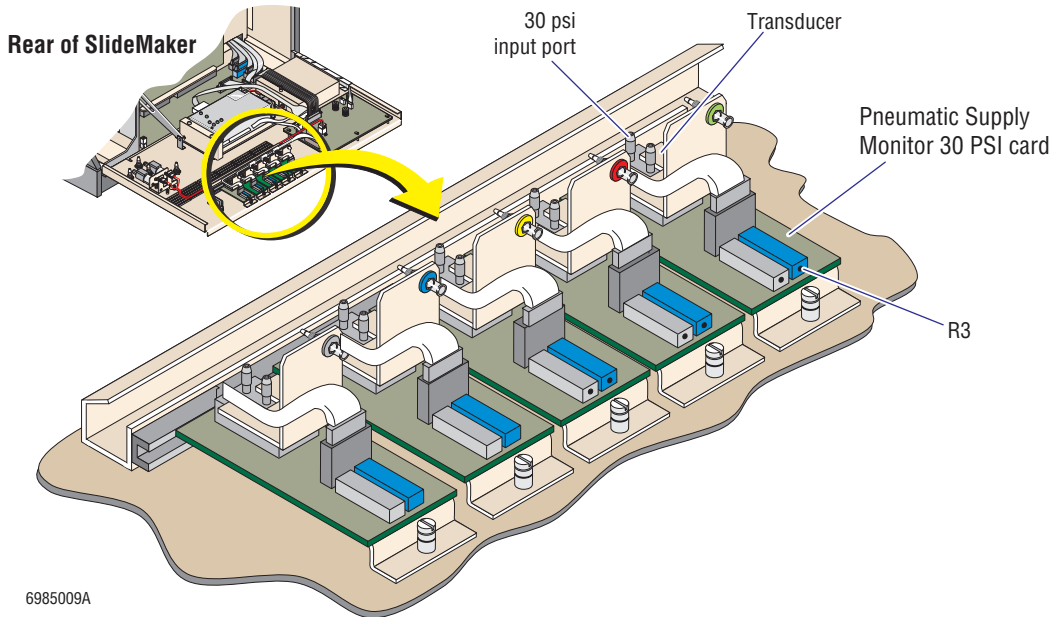
1. On the rear of the Diluter, disconnect the 30 psi supply line and connect it directly to the Marsh meter.
2. On the rear of the SlideMaker, disconnect the 30 psi supply line and leave it disconnected.
3. On the GEN•S System Power Supply, adjust the 30 psi regulator until the readout on the Marsh meter is 30.0 psi.
4. Verify the readout on the Power Supply is 30 psi ±0.1.

   If it is not, it could indicate a problem in the Power Supply. Correct the problem.
5. Disconnect the 30 psi line from the Marsh meter and reconnect it to the rear of the Diluter.
6. Connect the 30 psi supply line for the SlideMaker directly to the Marsh meter.
7. Verify the readout on the Marsh meter is 30.0 psi.

   If it is not, it could indicate a problem in the Diluter, such as an internal leak. Correct the problem.
8. Disconnect the 30 psi line from the Marsh meter and reconnect it to the rear of the SlideMaker.
9. Open the rear door of the SlideMaker to access the Pneumatic Supply Monitor, 30 Psi card. See Figure 4.27-1.
10. Disconnect the pressure input line from the Pneumatic Supply Monitor, 30 Psi card (the silicone tubing on the transducer) and connect the tubing to the Marsh meter.
11. Verify the readout on the Marsh meter is 30.0 psi.

    If it is not, it could indicate a problem between the rear of the SlideMaker and the Pneumatic Supply Monitor, 30 Psi card, such as a leaky quick-disconnect fitting. Correct the problem.
12. Disconnect the 30 psi line from the Marsh meter and reconnect it to the transducer.

Figure 4.27-1 Pneumatic Supply Monitor, 30 PSI Card Transducer Adjustment



13. Adjust the 30 psi transducer.
    a. On the SlideMaker screen, select **PNEUMATIC /POWER SUPPLIES** (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**).
    b. On the Pneumatic Supply Monitor, 30 Psi card (Figure 4.27-1), adjust R3 until the readout on the PNEUMATIC /POWER SUPPLIES screen is 30.0 psi.
14. Close the rear door of the SlideMaker.

5 MAINTENANCE PROCEDURES, 5.1-1

5.1 SYSTEM VERIFICATION PROCEDURE, 5.1-1
Purpose, 5.1-1
Tools/Supplies Needed, 5.1-1
Procedure, 5.1-1

5.2 SLIDEMAKER FUNCTIONALITY CHECKLIST, 5.2-1
Purpose, 5.2-1
Tools/Supplies Needed, 5.2-1
Preliminary Checks, 5.2-1
Dry Cycle Checks, 5.2-3
Blood Cycle Checks, 5.2-4

ILLUSTRATIONS

5.1-1 Using the Smear Template, 5.1-2
5.1-2 Checking the Smear Location on the Slide, 5.1-3

CONTENTS

5.1 SYSTEM VERIFICATION PROCEDURE

Purpose

Use this procedure at the end of each service call for the SlideMaker to ensure the SlideMaker is operating and aligned correctly.

Tools/Supplies Needed

- ❑ Several whole-blood specimens
- ❑ Smear Template, PN 5450459 (A copy of this template is provided at the end of this chapter for your use.)

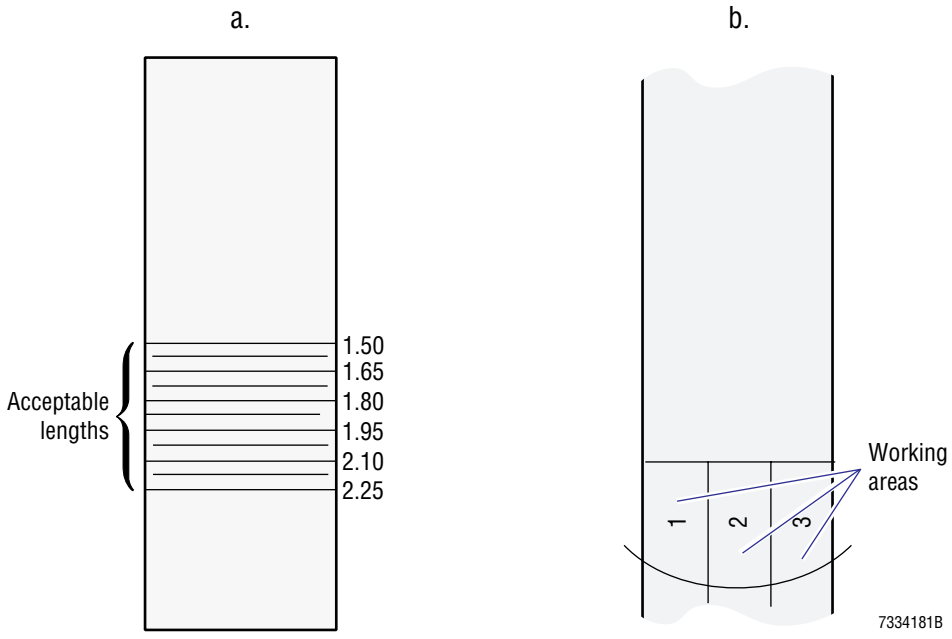
Procedure

1. On the SlideMaker screen, select **DRY CYCLE (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE ▸▸ DRY CYCLE**).
2. Do a minimum of 12 dry cycles and monitor movement of the slides through the SlideMaker.
   a. At the slide ejector station, ensure:
      - The slide is ejected from the slide cassette and is registered correctly.
      - The slide is picked up by the smear truck and the right-hand edge of the smear truck is about flush with the slide's edge.
   b. At the home position of the shuttle, ensure the smear truck places the slide correctly onto the shuttle.
   c. At the printer position of the shuttle, ensure the label is positioned correctly on the slide.
   d. From the printer position, ensure the shuttle moves correctly to the dispense position and then to the smear position.
   e. At the Dryer module, ensure the slide is pushed onto the conveyer belt correctly.
   f. At the Basket Queue module, ensure:
      - The slide is dropped from the Slide Elevator module into the slide basket correctly.
      - The slide baskets advance incrementally.
      - The slide baskets are transferred from the rear track to the front track and from the front track to the rear track correctly.
3. Correct any problems detected in step 2.
   - If the problems pertain to the movement or positioning of the shuttle, adjust the shuttle positions as instructed under Heading 4.3, HOME, PRINTER AND DISPENSE OFFSET SHUTTLE POSITION ADJUSTMENTS.
   - If the problems pertain to the movement or positioning of the smear truck, adjust the smear truck positions as instructed under Heading 4.4, PICK AND WICK SLIDE POSITION ADJUSTMENTS.
   - If the problems pertain to the alignment of the slide with the slide basket, adjust the platen as instructed under Heading 4.6, SLIDE ELEVATOR PLATEN ADJUSTMENTS.

4. Do a Shutdown cycle (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN**) to prime the cleaning agent line.
5. Do a Startup cycle (**MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN START UP**) to replace the cleaning agent in the SlideMaker with diluent.
6. Calibrate the fluid detectors as instructed under Heading 4.9.
7. Cycle whole-blood specimens with SlideMaker smears requested through the GEN•S System, using any test mode.
   a. As the blood samples are processed, ensure:
      1) The Sample Access and Reservoir module aspirates, transfers, mixes, and dispenses the blood samples from both reservoirs, correctly.
      2) The slides exiting the Dryer module are not chipped at the corners or on the edges.
   b. Using the Smear Template, analyze the macroscopic quality of the smears on the slides exiting the Dryer module:
      1) Compare the length of each smear to the measured lines on the Smear Template and ensure the end of the smear is between 1.50 in. and 2.25 in. See Figure 5.1-1a.

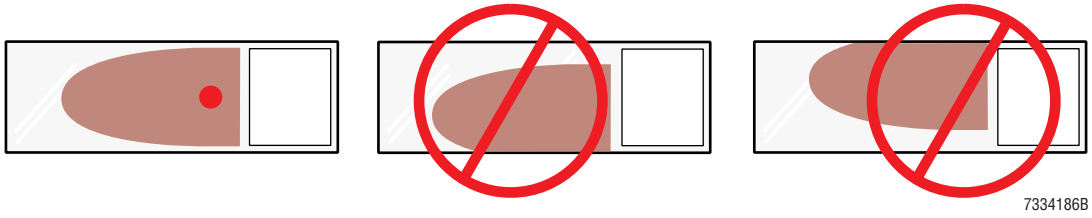
         Note: This smear length criterion is only applicable when the smear definition settings (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ DEFINE SMEAR SPEED**) are at their default settings of 5.
      2) Place the feathered edge of each smear against the curved line on the Smear Template and examine the three working areas. See Figure 5.1-1b. Ensure that at least two adjoining working areas (1 and 2 or 2 and 3) have no vacuoles, streaks, gaps, ridges or waves.

Figure 5.1-1 Using the Smear Template



c. If using Coulter slides with cut corners, ensure the smears are centered on the slide with margins on both sides as shown in Figure 5.1-2.

Figure 5.1-2 Checking the Smear Location on the Slide



8. If the SlideMaker meets the conditions in step 7, have a laboratory technician or an Applications Specialist verify the microscopic quality of the smears.

5.2 SLIDEMAKER FUNCTIONALITY CHECKLIST

Purpose

Use this procedure to check all the functions of the SlideMaker. You will do:

- Preliminary Checks to eliminate any known problems before cycling the SlideMaker.
- Dry Cycle Checks to observe the mechanical movements of the SlideMaker.
- Blood Cycle Checks to observe aspiration, smear making, and smear quality.

Tools/Supplies Needed

- ❑ Twelve whole-blood specimens

Preliminary Checks

1. At the Workstation, look at the SlideMaker error log and note any persistent or recurring SlideMaker errors.
   - If you know the cause of an error, correct it before proceeding.
   - If you do not know the cause of an error, use the following checks as a troubleshooting aid for locating the problem.
2. Obtain previously made smears from the customer and check the quality of the smears.
   - If the smear quality is not acceptable and you know why, correct the problem before proceeding.
   - If the smear quality is not acceptable and you do not know why, use the following checks as a troubleshooting aid for locating the problem.
3. At the Analytical Station, open the lower front cover of the Diluter and ensure:
   a. The SlideMaker aspiration tubing attached to the needle vent port of the needle has a yellow-striped tubing sleeve installed.

      If it does not, install one as directed in step 5, i, under Heading 3.3, MODIFYING THE ANALYTICAL STATION.

   b. The SlideMaker aspiration tubing is routed so that during piercing the needle cartridge bracket does not pinch the tubing.
4. Open the SlideMaker cover.
5. At the Cassette Transport assembly, ensure the Cassette Output Queue tubing is routed under the Slide Ejector module to prevent the input cassette transfer mechanism from pinching it.
6. At the Label Printer module:
   a. Verify the ribbon and label rolls are routed correctly.

      If not, correct the routing and show the customer how to do it correctly.

   b. Using the shuttle drive belt, manually move the shuttle under the printhead and verify the clearance is the thickness of one glass slide between the printhead and a slide on the shuttle or two glass slides between the printhead and the shuttle itself.

      If not, do the Printer Height above the Slide Adjustment procedure under Heading 4.5, PRINTER ADJUSTMENTS.

c. Examine the top-of-form sensor, printhead, and printer drive roller for stuck labels or evidence of glue.

   If labels or glue are present, clean the area as directed in Heading 4.12, PRINTHEAD CLEANING.

7. At the Dispense module, verify the dispense probe and the rinse cup are clean.

   If not, clean the dispense probe and rinse cup with a cotton swab dipped in 4% bleach and rinse with water as directed in the online help topic, Cleaning the Dispense Probe and Rinse Cup.

   Ensure the customer knows the dispense probe and rinse cup should be cleaned whenever there is evidence of blood build-up on the outside of the dispense probe or the inside of the rinse cup or at least once a week.

8. At the Cassette Transport assembly, observe the transfer of slide cassettes.

   a. Insert two slide cassettes into the Cassette Input Queue module.

   b. On the SlideMaker screen, select **ADVANCE CASSETTES** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ CASSETTE/SHUTTLE/BASKET ▸▸ ADVANCE CASSETTES**).

   c. Do several Advance Cassettes cycles to verify smooth, error- free transfer of the slide cassettes.

      Note: As a slide cassette is transferred into the Cassette Output Queue module, remove the slide cassette and reinsert it into the Cassette Input Queue module.

9. At the Basket Queue module, observe the operation of the crossover cylinders.

   a. Gripping a profile (basket pusher) on the rear belt, manually move the rear belt until a profile is located inside the rear belt position sensor, SEN31.

   b. On the SlideMaker screen, select **SOLENOID TEST** (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST).**

   c. Energize and de-energize SOL57 and verify:

      - The motion of the right crossover cylinder, CL2, is smooth.
      - When the right crossover arm is retracted, the arm is parallel with the frame of the Basket Queue module.

   d. If you encounter problems, ensure the following for the right crossover arm and CL2.

      - The screws on the crossover arm are tight.
      - The cables and tubing do not interfering with the crossover arm flag.
      - A choke fitting is installed on the crossover cylinder.
      - The special nut on the cylinder shaft is tight and has a flat washer and a lock washer.
      - The bracket for the cylinder is not bending and the cylinder nuts are tight.
      - If the motion is jerky, ensure the guiding slot is free of burrs from molding.

   e. Energize and de-energize SOL58 and verify:

      - The motion of the left crossover cylinder, CL1, is smooth.
      - When the left crossover arm is retracted, the arm is parallel with the frame of the Basket Queue module.

   f. If you encounter problems, repeat step d above, for the left crossover arm and CL1.

Dry Cycle Checks

Note: For a review of the Dry cycle sequence, see Dry Cycle Sequence Summary under Heading 4.2, USING THE SLIDEMAKER SERVICE FUNCTIONS.

1. Set up the SlideMaker for continuous Dry cycles.
   a. Ensure the Cassette Input Queue module has a fully loaded slide cassette and the Basket Queue module has empty slide baskets.
   b. On the SlideMaker screen, select **PERFORM SLIDE CYCLE (MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ PERFORM SLIDE CYCLE**).
   c. Set **SLIDE CYCLE** to **CONTINUOUS**.
   d. Select **DRY CYCLE** to start the function.
2. At the Slide Ejector module, verify the slide is ejected correctly and is registered correctly on the slide pickup bridge.

   If not, do the Slide Pusher Adjustment under Heading 4.15, SLIDE EJECTOR ADJUSTMENTS/ALIGNMENT.
3. Verify the slide is centered on the smear truck.
   - If not, and the smear truck is the **OLD** configuration, do the Slide Ejector Alignment procedure under Heading 4.15, SLIDE EJECTOR ADJUSTMENTS/ALIGNMENT.
   - If not, and the smear truck is the **NEW** configuration, do Heading 4.18, SMEAR TRUCK ALIGNMENT CHECKS AND ADJUSTMENTS.
4. Verify that when the smear truck places a slide on the shuttle, the slide is centered from front to back on the shuttle so that the O-ring provides a good seal.

   If not, do the Slide Ejector Alignment procedure under Heading 4.15, SLIDE EJECTOR ADJUSTMENTS/ALIGNMENT.
5. Verify the pick and the wick positions of the shuttle are set correctly.

   If not, do Heading 4.4, PICK AND WICK SLIDE POSITION ADJUSTMENTS.
6. At the Dryer module, verify the slide is transferred from the shuttle to the module correctly and that the slide is straight, not angled, on the conveyor belts.

   If not, do Heading 4.17, SLIDE STRIPPER PLATE ADJUSTMENT.
7. At the Slide Elevator module, verify the slide is dropped into the slide basket correctly.

   If not, ensure:
   - The platen is adjusted correctly. Do Heading 4.6, SLIDE ELEVATOR PLATEN ADJUSTMENTS.
   - SEN46 is aligned correctly. Do Heading 4.26, SEN37 (BASKET INDEX SENSOR) REPLACEMENT.
8. On the SlideMaker screen, select **SENSOR STATUS** (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**) and verify that when the slide drops into the slide basket both SEN37 and SEN41 are active.

   If not, do Heading 4.11, SEN41 (VERTICAL SLIDE SENSOR) ALIGNMENT.
9. At the Basket Queue module, verify the slide baskets are advancing correctly.

   If not, do Heading 4.25, BASKET QUEUE MODULE CHECKS AND ADJUSTMENTS.

10. Remove the dry cycle slides from the slide baskets and verify the labels are positioned correctly.

    If not, do the Setting the Printer Offset procedure under Heading 4.3, HOME, PRINTER AND DISPENSE OFFSET SHUTTLE POSITION ADJUSTMENTS.

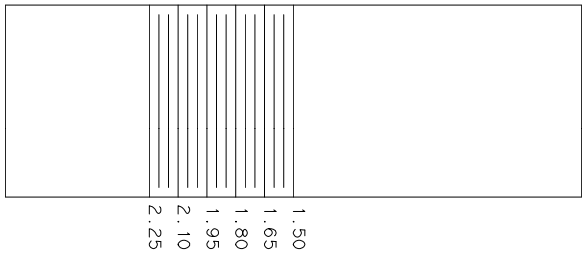
11. Stop the Dry cycles.

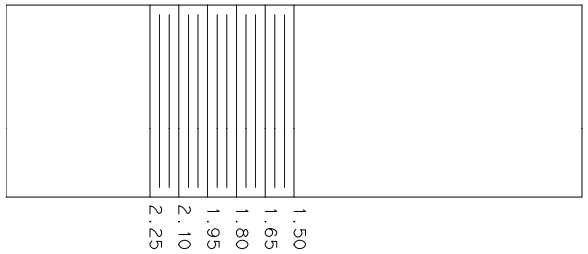
Blood Cycle Checks

1. Do Heading 4.9, FLUID DETECTOR CALIBRATION, to ensure the fluid detectors are calibrated correctly.
2. At the Workstation:
   a. Select ▸▸ **SlideMaker** tab.
   b. In the Patients Samples box, note the current setting, then select **All Samples**.
3. Run 12 whole-blood specimens on the GEN•S System or the LH 750 System.
4. Verify that blood is aspirated for the SlideMaker and is dispensed onto the slide correctly.
5. After the slides have exited the Dryer module, verify the smear quality.
   a. Using the Smear Template, analyze the macroscopic quality of the smears on the slides exiting the Dryer module:
      1) Compare the length of each smear to the measured lines on the Smear Template and ensure the end of the smear is between 1.50 in. and 2.25 in. Refer to Figure 5.1-1a.

         Note: This smear length criterion is only applicable when the smear definition settings (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ DEFINE SMEAR SPEED**) are at their default settings of 5.

      2) Place the feathered edge of each smear against the curved line on the Smear Template and examine the three working areas. Refer to Figure 5.1-1b. Ensure that at least two adjoining working areas (1 and 2 or 2 and 3) have no vacuoles, streaks, gaps, ridges or waves.
   b. If using Coulter slides with cut corners, ensure the smears are centered on the slide with margins on both sides. For an example, refer to Figure 5.1-2.
6. At the Workstation, select ▸▸ **SlideMaker** tab, and return the setting in the Patients Samples box to the original setting.





SERVICE
DO NOT REPRODUCE!
ACCURACY OF DIMENSIONS WILL BE COMPROMISED
DUE TO DISTORTION.

TITLE		SIZE	ARTWORK No.	REV.	CN	APPROVED
TEMPLATE, SLIDE		B	5450459	A	REFER TO CPDM	N. TOUTOUNGI CPDM APPROVAL
PROJECT No.	SCALE	ORIGINATOR	DATE	△	△	△
0301	1/1	NICOLE PARISI	21AUG98			
COULTER CORPORATION		SHT 1 OF 1		△	△	△

6 SCHEMATICS, 6.1-1

6.1 SCHEMATICS REQUIRED, 6.1-1

CONTENTS

6.1 SCHEMATICS REQUIRED

The following is a list of the engineering schematics you need for troubleshooting the SlideMaker.

Name	PN
Pneumatic/Hydraulic Schematic	6323138
GEN•S SM Integrated SlideMaker Interconnect Block Diagram	6323239
GEN•S SM Integrated SlideMaker Interconnect Diagram	6321624

Electronic (.pdf) files of these schematics are available on a separate CD-ROM in the Service Resource Kit (SRK) and in a Lotus Notes® database. The schematics in the SRK are the latest revisions available at the time the SRK is released. For copies of schematics released between revisions of the SRK, check the Lotus Notes database. It will always have the most current revisions.

Note: Depending on the configurations of this instrument in the field, more than one revision of a schematic can be valid.

If you want to include schematics in the printed version of this manual, make printouts of the electronic files and insert them at the end of this chapter.

7 TROUBLESHOOTING, 7.1-1

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About the Tables in Heading 7.2, Tables of SlideMaker Error Messages, 7.1-1
Icons and Traffic Lights Displayed on the Workstation with System Messages, 7.1-2

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7.3 TROUBLESHOOTING TIPS FOR THE SLIDE AND SMEAR MODULE, 7.3-1
Troubleshooting Blood Smear Quality Problems, 7.3-1
Troubleshooting Smear Module Alignment Problems, 7.3-1
Troubleshooting the Servo System, 7.3-1

7.4 SOFTWARE INSTALLATION ERRORS, 7.4-1

TABLES

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7.2-3 Cassette Error Messages, 7.2-9
7.2-4 Communication Error Messages, 7.2-12
7.2-5 Dispense Error Messages, 7.2-15
7.2-6 Dryer Error Messages, 7.2-17
7.2-7 Ejector Error Messages, 7.2-22
7.2-8 Fluidics Error Messages, 7.2-25
7.2-9 Pneumatics Error Messages, 7.2-28
7.2-10 Power Error Messages, 7.2-34
7.2-11 Printer Error Messages, 7.2-38
7.2-12 Reagent Error Messages, 7.2-40
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7.1 SLIDEMAKER MESSAGES

The SlideMaker automatically monitors many of its activities and conditions, tries to recover when the system does not respond as expected, and generates a message to alert the operator when it is unable to recover from the error condition. For most error conditions, a message is displayed on both the SlideMaker screen and at the Workstation.

Any messages that are logged at the Workstation appear in the following format: date, time, instrument name, operator name, message.

The tables under Heading 7.2, describe the SlideMaker error messages. The information in these tables was copied from revision R of the GEN•S System Messages, PN 0300120, and revision C of the LH 750 System Messages, PN 0304633.

About the Tables in Heading 7.2, Tables of SlideMaker Error Messages

The SlideMaker messages are divided into tables by category, and within each table are arranged alphabetically by SlideMaker message. Any message that does not fall into one of the following thirteen categories is in Table 7.2-1, Miscellaneous System Messages.

Categories	Tables
Basket Error Messages	Table 7.2-2
Cassette Error Messages	Table 7.2-3
Communication Error Messages	Table 7.2-4
Dispense Error Messages	Table 7.2-5
Dryer Error Messages	Table 7.2-6
Ejector Error Messages	Table 7.2-7
Fluidics Error Messages	Table 7.2-8
Pneumatics Error Messages	Table 7.2-9
Power Error Messages	Table 7.2-10
Printer Error Messages	Table 7.2-11
Reagent Error Messages	Table 7.2-12
Shuttle Error Messages	Table 7.2-13
Truck Error Messages	Table 7.2-14

For each message, these tables list the SlideMaker status, the probable causes and corrective actions, and the messages displayed in the Workstation log, with the applicable icons.

Note: These error message tables contain the same information given to the SlideMaker operators, plus more. Leaving the statement “call your Beckman Couter Representative” in the corrective action, lets you know how much a customer is expected to do before calling.

For ease of access to the troubleshooting information, all the error messages are also listed in the index.

Icons and Traffic Lights Displayed on the Workstation with System Messages

Icons are used to flag certain instrument conditions. In the error message tables, either the relevant icon or a text description, such as "red light" for the red traffic light icon, is included.

The SlideMaker icon is displayed on the Command Center when the SlideMaker is stopped.

GEN•S System

LH 750 System

A red traffic light is displayed on the Command Center when immediate action is required.

Double-clicking on the red traffic light displays the error message and a button for clearing the error. Double-clicking on the error message displays the Help topic for that message.

GEN•S System

LH 750 System

A yellow traffic light is displayed on the Command Center when caution is required. However, a red light supersedes a yellow light. (For example, if another condition occurs that triggers a red light, the red light is displayed until that condition is resolved, then the yellow light appears.)

Double-clicking on the yellow traffic light displays the warning message. Double-clicking on the warning message displays the Help topic for that message.

7.2 Tables of SlideMaker Error Messages

Table 7.2-1 Miscellaneous System Messages

SLIDEMAKER		WORKSTATION			RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**			**SlideMaker Status**	**Probable Cause**	**Corrective Action**
N/A **Internal Message Code, Description and No:** EV_SM_NO_RESPOND	No	Event Log *SlideMaker Did Not Respond.*		Red light	N/A	• The SlideMaker is off. • The SlideMaker is disconnected.	1. Verify the SlideMaker is connected and on. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists, call your Beckman Coulter Representative.
N/A **Internal Message Code, Description and No:** EV_SM_DOWNLOAD_OK	No	SlideMaker Log *SlideMaker Download Successful.*	No	N/A	Ready	N/A	N/A
N/A **Internal Message Code, Description and No:** EV_SM_DOWNLOAD FAILED	No	Event Log *SlideMaker Download Unsuccessful.*		If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	N/A	Download initiated by customer failed.	1. Turn the SlideMaker off and then on. 2. Reinitiate the download. 3. If the message persists, call your Beckman Coulter Representative.
N/A **Internal Message Code, Description and No:** EV_SM_DOWNLOAD_NEEDED	No	Event Log *SlideMaker Needs To Download The New Software.*		If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	Ready	Revision level mismatch.	Initiate download.
N/A **Internal Message Code, Description and No.** EV_SM_COMM_PROBLEM	No	SlideMaker Log *SlideMaker Communication Problem*		If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	Ready	• The SlideMaker is off. • The SlideMaker is disconnected.	1. Verify the SlideMaker is connected and on. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists, call your Beckman Coulter Representative.
N/A **Internal Message Code, Description and No:** XXX, SM FAULT	N/A	SlideMaker Log *Unknown Error Code Received From SlideMaker: <Error Code>.*	No		No known problems identified, so continues operation.	Workstation received an unknown error code from the SlideMaker	If the message persists: 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off and then on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resume Analytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. If the dryer belts had stopped motion, review the slides that were within the dryer area as they may have excessive heat damage. d. Call your Beckman Coulter Representative.
N/A **Internal Message Code, Description and No.** EV_SM_SHUTDOWN	N/A	SlideMaker Log *Operator Performed A Shutdown On The Slidemaker*	N/A	N/A	SlideMaker stops.		No action necessary.

Table 7.2-1 Miscellaneous System Messages *(Continued)*

SLIDEMAKER		WORKSTATION			RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**			**SlideMaker Status**	**Probable Cause**	**Corrective Action**
AUTO SLIDE **Internal Message Code, Description and No:** EV_SM_AUTO_SLIDE (127)	No	SlideMaker Log *SlideMaker Automatically Made A Slide Using Default Parameters.*		Yellow light	SlideMaker printed Auto Slide on the label and automatically created a slide using default parameters.	• Analytical Station performed an Auto Clear cycle. • Delay in the Workstation.	No action necessary.
BUSY **Internal Message Code, Description and No:** 00FF, BUSY	No	N/A	No	N/A	• SlideMaker is running a sample. • SlideMaker is in the Service mode.	• SlideMaker is running a sample. • SlideMaker is in the Service mode.	No action necessary
INCOMPLETE ASPIRATION **Internal Message Code, Description and No:** EV_SM_INCOMPLETE_ASPIRATION_ERROR (82)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Incomplete Aspiration.*		For the first two incomplete aspirations in a row, yellow light. For the third incomplete aspiration in a row, red light.	The incomplete sample is discarded. If three consecutive incomplete aspirations occur: 1. No new samples are aspirated. 2. Completed smears are dried and deposited in a slide basket. 3. The SlideMaker stops and an error is sent to the Workstation.	Blood is not sensed by the correct fluid detector during aspiration because: • The blood is too viscous and did not reach the detector in time. • The specimen tube has insufficient blood sample. • The vacuum for advancing the blood is insufficient. • The fluid detector failed. • A solenoid failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. If this message only appears for one sample, check the specimen condition and volume. 2. If this message appears for three consecutive samples: a. Ensure the last three specimen tubes had enough blood. (The SlideMaker needs 250 µL). b. If there is sufficient blood in the specimen tubes, clean the aspiration lines: 1) From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN** to flush the lines with cleaning agent. 2) From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN START UP** to rinse the lines with diluent. 3. Resume normal operation. If the message persists: a. Wait until the last slide in the Dryer module is deposited in a slide basket. b. Turn off the SlideMaker. c. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. d. Call your Beckman Coulter Representative.

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Table 7.2-1 Miscellaneous System Messages *(Continued)*

SLIDEMAKER		WORKSTATION			RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**			**SlideMaker Status**	**Probable Cause**	**Corrective Action**
MAIN COVER OPEN (SENSOR 53) **Internal Message Code, Description and No:** EV_SM_UNIT_DOOR_OPEN (01)	**GEN•S SM SlideMaker** Yes **LH SlideMaker** No	SlideMaker Log *SlideMaker Main Cover Open (Sensor 53).*		If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	If in the Service mode, the SlideMaker continues operating normally. If in the Normal mode: 1. Any truck operation in progress continues. 2. The Label Printer continues (if operating). 3. Any sample already aspirated is processed until its smear is dried and deposited in a slide basket. Two slides may be completed before the SlideMaker stops. 4. No new samples are aspirated. 5. If the Printer is out of labels or ribbon, CL4 is retracted, releasing the printhead, so you can insert the new label or ribbon roll. **Note:** The printhead is closed again when, with the cover closed, you reset the SlideMaker. 6. The SlideMaker stops.	1. Operator opened the main cover while unit was in operation. 2. Main cover interlock (SEN53) is obstructed or defective.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. If the cover appears closed, open the cover and close it again. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Ensure SEN53 is unobstructed. b. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 4. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
NOT READY **Internal Message Code, Description and No:** 0055, READY	No	N/A	N/A	N/A	• SlideMaker is not enabled for making slides. • SlideMaker is waiting to initialize.	• SlideMaker is waiting to initialize. • SlideMaker is not enabled for making slides.	1. If the SlideMaker is waiting to initialize, wait until initialization has completed. 2. If the Slide Maker is not enabled for making slides, enable the SlideMaker at the Workstation. Refer to the Online Help procedure, Ensuring the SlideMaker Is Enabled.
READY **Internal Message Code, Description and No:** EV_SM_READY	No	N/A	No	N/A	Ready	N/A	No action necessary.
RESET IN PROGRESS, PLEASE WAIT **Internal Message Code, Description and No:** EV_SM_RESET_BUTTON_ PRESSED (123)	No	N/A	N/A	N/A	1. The reset request is held pending until the end of the current cycle or until 120 seconds have elapsed since the last aspiration. During the pending state the reset request message is displayed and the reset light is lit. 2. When the reset command is executed, the message is removed and the reset light goes out.	Operator pressed reset button.	No action necessary.

Table 7.2-1 Miscellaneous System Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
WARNING: SLIDE FELL FROM DRYER **Internal Message Code, Description and No:** EV_SM_SLIDE_MISPLACED_ SERVO_TRUCK_AREA_ERROR (84)	Yes	SlideMaker Log *This Is A Waning Only. A Slide Entered The Dryer Area And Has Not Made It Out Of The Dryer.* Yellow light	Warning only. The SlideMaker continues operating normally.	• The operator manually removed a slide from the dryer. • The slide pusher bars did not transfer the slide from the shuttle to the dryer belts. • The dryer motor is not operating correctly. • The dryer exit sensor, SEN49, failed. • One or both of the dryer conveyer belts broke and the slides fell somewhere within the Dryer module or between the shuttle and the Dryer module.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. If an operator manually removed a slide from the Dryer module, ignore this warning. 2. If no-one manually removed a slide from the Dryer module: a. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Ensure the dryer belts are moving. c. Check inside the dryer for fallen slides. Retrieve and inspect any fallen slides for possible heat damage. d. Check the entrance to the Dryer module for fallen slides. Retrieve and place any fallen slides in a slide basket for staining. e. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-2 Basket Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
BASKET (ALL BASKETS FULL) **Internal Message Code, Description and No:** EV_SM_NO_EMPTY_BASKET_ERROR (104)	Yes	SlideMaker Log *SlideMaker: No Empty Basket Available.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	After a slide is deposited in a slide basket, the slide baskets are advanced to prepare for the next slide. Not detecting an open position after testing all the basket positions could indicate: • All the slide baskets are full. • The basket index sensor, SEN37, is not working correctly.	**Note**: Press any key on the SlideMaker screen to reset the alarm. 1. If all the slide baskets are full, replace the full baskets with empty baskets. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Inspect the area under the smear truck for a fallen slide and retrieve if possible. e. Close the cover and call your Beckman Coulter Representative
BASKET (CORNERS FULL) - **GEN•S SM SlideMaker only** **Internal Message Code, Description and No.** EV_SM_TRANSFER_BETWEEN_BELTS_IMPOSSIBLE_ERROR (99)	Yes	SlideMaker Log *SlideMaker: Transfer Of Basket Between Belts Not Possible.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	**Note:** This condition can also generate a *SlideMaker Basket Track Full.* error at the Workstation. • Each of the four corners of the Basket Queue module has a slide basket so a slide basket cannot be transferred from one track to the other. • One of these basket or belt position sensors is blocked: ▸ Rear belt position, SEN31 ▸ Front belt position, SEN32 ▸ Basket present rear right, SEN33 ▸ Basket present front right, SEN34 ▸ Basket present rear left, SEN35 ▸ Basket present front left, SEN36 • SEN31, SEN32, SEN33, SEN34, SEN35 or SEN36 failed, indicating a corner has a slide basket when it does not. • The track belts are misaligned; a basket is not actually at the corner.	**Note:** Press any key on the SlideMaker screen to reset the alarm 1. If all four corners of the Basket Queue module are occupied, remove the filled slide baskets. 2. If the corners of the Basket Queue module are not occupied, wait until the dryer belts stop moving. 3. Acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-2 Basket Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
BASKET (CORNERS FULL) **Internal Message Code, Description and No:** EV_SM_BASKET_MOVE_IMPOSSIBLE_ERROR (101)	Yes	SlideMaker Log *SlideMaker Basket Track Full.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	**Note:** This condition can also generate a *SlideMaker: Transfer Of Basket Between Belts Not Possible* error at the Workstation. • Each of the four corners of the Basket Queue module has a slide basket so a slide basket cannot be transferred from one track to the other. • Only one track is moving and the end of that track has a slide basket. • One of these basket or belt position sensors is blocked: ‣ Rear belt position, SEN31 ‣ Front belt position, SEN32 ‣ Basket present rear right, SEN33 ‣ Basket present front right, SEN34 ‣ Basket present rear left, SEN35 ‣ Basket present front left, SEN36 • SEN31, SEN32, SEN33, SEN34, SEN35 or SEN36 failed, indicating a corner has a slide basket when it does not. • The track belts are misaligned; a basket is not actually at the corner.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. If all four corners are occupied, or if the slide basket position at the end of a track is occupied, remove the filled slide baskets. 2. If the corners of the Basket Queue module are not occupied, wait until the dryer belts stop moving. 3. Acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation.Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
BASKET (DID NOT FULLY ADVANCE) **Internal Message Code, Description and No:** EV_SM_BASKET_MOVE_TIMEOUT_ERROR (102)	Yes	SlideMaker Log *SlideMaker Basket Did Not Fully Advance.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The slide basket exceeded the maximum time allotted to finish its motion. This could indicate: • An obstruction in the Basket Queue module. • Stepper motor MF3 or MF4 failed. • One of these basket or belt position sensors failed. ‣ Rear belt position, SEN31 ‣ Front belt position, SEN32 ‣ Basket present rear right, SEN33 ‣ Basket present front right, SEN34 ‣ Basket present rear left, SEN35 ‣ Basket present front left, SEN36	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Inspect both tracks in the Basket Queue module for obstructions. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 2. Open the basket cover and inspect the area under the basket for a broken or fallen slide and retrieve if possible. 3. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation.Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-2 Basket Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
BASKET (DID NOT TRANSFER BETWEEN BELTS) **Internal Message Code, Description and No:** EV_SM_TRANSFER_TIMEOUT_ERROR (100)	Yes	SlideMaker Log *SlideMaker Basket Did Not Transfer Between Belts* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	• A jam prevented completion of the slide basket transfer. • When you turned the SlideMaker on, a basket was in a corner but not at a belt position sensor. • One of the sensors monitoring the extension and retraction of the cylinder that transfers the slide baskets from one track to the other is blocked. Extension is detected by the corner sensor opposite the slide basket. The corner sensors are: ‣ Basket present rear right, SEN33 ‣ Basket present front right, SEN34 ‣ Basket present rear left, SEN35 ‣ Basket present front left, SEN36 Retraction is detected by sensors on the cylinders: ‣ Left crossover home, SEN39 ‣ Right crossover home, SEN40 • SEN33, SEN34, SEN35, SEN36, SEN39, or SEN40 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm 1. Wait until the dryer belts stop moving. 2. Remove any jammed slide baskets. 3. Acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
BASKET (MOVE POSITION) **Internal Message Code, Description and No.** EV_SM_BASKET_MOVE_POSITION_ERROR (103)	Yes	SlideMaker Log *SlideMaker Basket Move Position Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear is transferred to the Dryer module. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The slide basket did not reach the desired position after the number of steps required. This could indicate: • The slide basket is jammed. • The rear belt position, SEN31, or the front belt position, SEN32, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Remove the jammed slide basket. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 2. Open the basket cover and inspect the area under the basket for a broken or fallen slide and retrieve if possible. 3. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-2 Basket Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
BASKET (SLIDE NOT PLACED IN BASKET) **Internal Message Code, Description and No:** EV_SM_SLIDE_MISPLACED_PLATEN_ERROR (105)	Yes	SlideMaker Log *SlideMaker: Slide Not Placed in Basket* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. Any completed smear remains on the shuttle. 4. The Dryer module continues to operate until a slide is ready to exit from the module. 5. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The gripper detected a slide when the slide exited the Dryer module, but neither the basket index sensor, SEN37, nor the vertical slide sensor, SEN41, detected a slide in the slide basket. This could indicate: • The slide fell from the Slide Elevator module into the slide basket at an angle which did not interrupt the beam of the basket index sensor. • The basket index sensor, SEN37, and the vertical slide sensor, SEN41, are misaligned. • Slide edge characteristics do not meet specifications. For specifications refer to Online Help System topic "Physical Specifications - SlideMaker".	**Note:** Press any key on the SlideMaker screen to reset the alarm. **WARNING** Risk of contamination. The prepared smears contain biohazardous material. Handle with care and avoid skin contact. 1. Open the basket cover and inspect the area under the basket for fallen or broken slides. 2. Retrieve the slides if possible and place in a slide basket for staining. 3. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note**: You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-3 Cassette Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
CASSETTE (CYLINDER SENSORS) **Internal Message Code, Description and No:** EV_SM_OUTPUT_PUSHER_ SENSOR_FAILURE_ERROR (59)	Yes	SlideMaker Log *SlideMaker Cassette Output Queue Is Obstructed Or Sensor Failed.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The sensors for the output cassette transfer mechanism (the mechanism that advances the slide cassettes in the Cassette Output Queue module) indicating the cylinder is both extended and retracted at the same time because: • The output cassette retracted sensor, SEN15, or the output cassette extended sensor, SEN16, is blocked. • SEN15 or SEN16 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Remove empty cassettes. 2. Place a full cassette in input queue. 3. Acknowledge the error at the Workstation to reset the SlideMaker and continue. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
CASSETTE (EXTEND TIMEOUT) **Internal Message Code, Description and No:** EV_SM_TIMEOUT_CASSETTE_ TRANSFER_ TO_OUTPUT_ ERRO (60)	Yes	SlideMaker Log *SlideMaker Cassette Transfer To Output Queue Timeout.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The upper cassette transfer mechanism (the mechanism that advances the empty cassette from the Cassette Input Queue module to the Cassette Output Queue module) did not extend within the allowable time, or the sensor did not detect its extension because: • The upper cassette transfer mechanism is jammed. • The cylinder, CL9, failed. • The cassette transit sensor, SEN30, is blocked or failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Remove all cassettes. 2. Place a full cassette in input queue. 3. Acknowledge the error at the Workstation to reset the SlideMaker.and continue. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
CASSETTE (LOCK SENSOR) **Internal Message Code, Description and No.** EV_SM_CASSETTE_LOCK_ SENSOR_ERROR (54)	Yes	SlideMaker Log *SlideMaker Cassette Lock Sensor Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The cassette locked sensor, SEN21, and cassette unlocked sensor, SEN22, indicate that the cassette is both locked and unlocked at the same time because: • SEN21 or SEN22 failed. • SEN21 or SEN22 is blocked (not a likely cause).	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker. 3. Remove and reinstall the slide cassette that is in the slide ejector station. 4. Turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
CASSETTE (LOCKED, SENSOR 21) **Internal Message Code, Description and No:** EV_SM_CASSETTE_LOCKED_ ERROR (56)	Yes	SlideMaker Log *SlideMaker Cassette Locked (Sensor 21).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	A timeout occurred in attempting to unlock the slide cassette at the slide ejection station. A locked empty slide cassette cannot be transferred to the Cassette Output Queue module. • The locking mechanism did not unlock the slide cassette. • The cassette locked sensor, SEN21, failed.	**Note**: Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker. 3. Remove and reinstall the slide cassette that is in the slide ejector station. 4. Turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-3 Cassette Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
CASSETTE (NO CASSETTE) **Internal Message Code, Description and No:** EV_SM_TIMEOUT_OUT_OF_ INPUT_SLIDES_ERROR (63)	Yes	SlideMaker Log *If No Cassette Is Present In The Input Queue Then Add Loaded Cassette.* Red light	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• No slide cassette is available at the Cassette Input Queue module. • The cassette present sensor, SEN26, indicates no slide cassette is present, but a slide cassette is present.	**Note**: Press any key on the SlideMaker screen to reset the alarm. 1. If the Cassette Input Queue module is empty: a. Place a full slide cassette in the Cassette Input Queue module. b. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If a full slide cassette is in the Cassette Input Queue module: a. Wait until the last slide in the Dryer module is deposited in a slide basket. b. At the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ UNLOCK CASSETTE** to unlock the cassette. c. Remove and reinstall the slide cassette that is in the slide ejector station. d. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.:
CASSETTE (NOT LOCKED, SENSOR 22) **Internal Message Code, Description and No.** EV_SM_CASSETTE_NOT_ LOCKED_ERROR (55)	Yes	SlideMaker Log *SlideMaker Cassette Not Locked (Sensor 22).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	A timeout occurred in attempting to lock a slide cassette in place for drawing slides. Slide cannot be ejected from an unlocked slide cassette. • The locking mechanism did not lock the slide cassette in place. • The cassette unlocked sensor, SEN22, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker. 3. Remove and reinstall the slide cassette that is in the slide ejector station. 4. Turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
CASSETTE (OUTPUT QUEUE FULL) **Internal Message Code, Description and No:** EV_SM_FULL_OUTPUT_ QUEUE_ERROR (57)	Yes	SlideMaker Log *SlideMaker Cassette Output Queue Full.* Red light	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The output cassette transfer mechanism (the mechanism that advances the slide cassettes in the Cassette Output Queue module) did not advance to its retracted state, or the sensor did not detect its advancement, because: • The Cassette Output Queue module is full. • The cylinder, CL7, failed. • The output cassette retracted sensor, SEN15, failed.	**Note**: Press any key on the SlideMaker screen to reset the alarm. 1. If the Cassette Output Queue module is full: a. Remove the empty slide cassettes. b. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the Cassette Output Queue module is not full: a. Wait until the last slide in the Dryer module is deposited in a slide basket. b. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-3 Cassette Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
CASSETTE (RETRACT TIMEOUT) **Internal Message Code, Description and No:** EV_SM_TIMEOUT_BACK_FROM_ OUTPUT_ FAILURE (61)	Yes	SlideMaker Log *SlideMaker Cassette Transfer Retract Timeout.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The upper cassette transfer mechanism (the mechanism that advances the empty cassette from the Cassette Input Queue module to the Cassette Output Queue module) did not retract within the allowable time, or the sensor did not detect its retraction because: • The upper cassette transfer mechanism is jammed. • The cylinder, CL9, failed. • The cassette transfer home sensor, SEN8, is blocked or failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker. 3. Remove all the slide cassettes from the Cassette Input Queue and Cassette Output Queue modules. 4. Manually push the upper cassette transfer mechanism back to the retracted position (to the left). 5. Put a full slide cassette in the Cassette Input Queue module. 6. Turn on the SlideMaker. 7. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
CASSETTE (TRANSFER TIMEOUT) **Internal Message Code, Description and No:** EV_SM_OUTPUT_PUSHER_TIMEOUT_ ERROR (58)	Yes	SlideMaker Log *SlideMaker Cassette Output Queue Cylinder Did Not Extend in Time.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The cylinder in the output cassette transfer mechanism (the mechanism that advances the slide cassettes in the Cassette Output Queue module) did not extend in time, or the sensor did not detect its extension, because: • The cylinder, CL7, failed. • The output cassette extended sensor, SEN16, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Remove all cassettes. 2. Place a full cassette in input queue. 3. Acknowledge the error at the Workstation to reset the SlideMaker and to continue. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-4 Communication Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
COMMUNICATION (ANALYZER CRC) **Internal Message Code, Description and No:** EV_SM_HOST_COMM_ERROR (05)	Yes	SlideMaker Log *SlideMakerTo Analytical Station Communication Lost (CRC Check Failed).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If this error occurred after a sample was ready to be dispensed onto the slide, a smear is made for that sample. 3. Any other sample in a reservoir is discarded. 4. Completed smears are dried and deposited in a slide basket.	Five consecutive messages from the SlideMaker to the Analytical Station were not acknowledged.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check if the Analytical Station is working correctly. If necessary, reset the Analyzer. 2. If the message persists, wait until the last slide in the Dryer module is deposited in a slide basket, then acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
COMMUNICATION (ANALYZER TIMEOUT) **Internal Message Code, Description and No:** EV_SM_NO_HOST_COMM_ERROR (06)	No	SlideMaker Log *SlideMaker To Analytical Station Communication Timeout.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If this error occurred after a sample was ready to be dispensed onto the slide, a smear is made for that sample. 3. Any other sample in a reservoir is discarded. 4. Completed smears are dried and deposited in a slide basket.	No response from the Analytical Station.	1. Check if the Analytical Station is working correctly. If necessary, reset the Analyzer. 2. If the message persists, wait until the last slide in the Dryer module is deposited in a slide basket, then acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
COMMUNICATION (CANNOT PERFORM REQUEST AT THIS TIME) **Internal Message Code, Description and No:** EV_SM_HOST_NOT_IDLE_ERROR (11)	Yes	SlideMaker Log *SlideMaker Cannot Perform Request At This Time.* Yellow light	SlideMaker continues current operation.	The operator requested an operation requiring the SlideMaker and Analytical Station to be in the *READY* state, while one of them was not ready. Requests such as, shutdown and startup.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the Analyzer and SlideMaker screens display READY. 2. Repeat the request.
COMMUNICATION (FLASH MEMORY) **Internal Message Code, Description and No:** EV_SM_FLASH_WRITE_ERROR (13)	Yes	SlideMaker Log *SlideMaker FLASH MEMORY Communication Failure. FATAL ERROR.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops. A fatal error occurred during: • Download from the Workstation. The flash memory has unknown or unreliable information. • Service mode changes to the flash memory contents.	Erase error, write error or verify memory error when placing parameters in the flash memory.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. 3. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. 4. Close the cover and call your Beckman Coulter Representative.
COMMUNICATION (ID MISMATCH) **Internal Message Code, Description and No:** EV_SM_SAMPLE_ID_MISMATCH (122)	No	SlideMaker Log *SlideMaker Sample ID Mismatch. Sample Discarded <Sample ID>. Prepare slide manually, or re-run on Analytical Station.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. The sample which could not be matched with the correct ID is discarded. 2. The SlideMaker continues operating normally.	Sample ID from Analyzer does not match sample ID from Workstation.	1. Check the identification of the sample. 2. Rerun the specimen or prepare a slide manually.

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Table 7.2-4 Communication Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION		RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**		**SlideMaker Status**	**Probable Cause**	**Corrective Action**
COMMUNICATION (PC CRC) **Internal Message Code, Description and No:** EV_SM_ADMS_COMM_ERROR (03)	Yes	N/A *Workstation communications CRC error. If necessary reset the Workstation.*	No N/A	1. The sample for which the communication error occurred is discarded. 2. No new samples are aspirated. 3. Completed smears are dried and deposited in a slide basket.	Five consecutive messages from the Workstation to the SlideMaker failed the CRC verification.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check if the Workstation is working correctly. If necessary, shutdown and restart the Workstation. 2. If the message persists, wait until the last slide in the Dryer module is deposited in a slide basket, then acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
COMMUNICATION (PC TIMEOUT) **Internal Message Code, Description and No:** EV_SM_NO_ADMS_COMMUNICATION (04)	Yes	SlideMaker Log *SlideMaker To Workstation Communication Timeout.*	If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket.	1. No response from the Workstation. 2. Handshake signals absent when information is required.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check if the Workstation is working correctly. If necessary, shutdown and restart the Workstation. 2. If the message persists, wait until the last slide in the Dryer module is deposited in a slide basket, then acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
COMMUNICATION (PROC A/B) **Internal Message Code, Description and No:** EV_SM_INTER_PROCESS_COMM_ERROR (10)	Yes	SlideMaker Log *SlideMaker Inter Processor Communication Failure.*	If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If a sample was in a reservoir before this error occurred, a smear is made for that sample. 3. Completed smears are dried and deposited in a slide basket. **Service Only:** Since error messages/commands are not transferred from processor "B" to "A," processor "A" is unable to verify voltages, pressures and temperatures.	Unrecognizable or unexpected messages.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-4 Communication Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
COMMUNICATION (RAM ERROR) **Internal Message Code, Description and No.** EV_SM_BATTERY_BACKED_RAM_ERROR (14)	Yes	SlideMaker Log *SlideMaker BATTERY BACKED RAM Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	Failure in reading or writing the parameters to the battery-backed RAM.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-5 Dispense Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DISPENSE (PROBE NOT DOWN, SEN 12) **Internal Message Code, Description and No.** EV_SM_PROBE_NOT_DOWN_ERROR (80)	Yes	SlideMaker Log *SlideMaker Dispense Probe Not Down (Sensor 12).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The dispense probe must be down to discard the front part of the blood, to deposit a drop on the slide, and to backwash. The dispense probe is not down at the correct times in the cycle, or the sensor does not detect the probe is down, because: • The dispense probe is stuck. • The mechanism that pushes the dispense probe down is not receiving sufficient pressure. • Probe down sensor, SEN12, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
DISPENSE (PROBE NOT UP, SENSOR 11) **Internal Message Code, Description and No.** EV_SM_PROBE_NOT_UP_ERROR (79)	Yes	SlideMaker Log *SlideMaker Dispense Probe Not Up (Sensor 11).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The dispense probe must be up for the shuttle to bring a slide to the dispense position. The dispense probe is not up at the correct time in the cycle, or the sensor did not detect the probe is up, because: • The dispense probe is stuck. • The mechanism that lifts the dispense probe is not receiving sufficient pressure. • The probe up sensor, SEN11, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-5 Dispense Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DISPENSE (SENSORS) **Internal Message Code, Description and No:** EV_SM_PROBE_SENSOR_FAILURE_ERROR (81)	Yes	SlideMaker Log *SlideMaker Dispense Probe Sensor Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The probe up sensor, SEN11, and the probe down sensor, SEN12, indicate the dispense probe is both up and down at the same time because: • SEN11 or SEN12 is blocked. • SEN11 or SEN12 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Check the area below the smear truck for fallen slides and retrieve if possible. 5. Close the cover and turn on the SlideMaker. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-6 Dryer Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DRYER (EXTEND, SENSOR 10) **Internal Message Code, Description and No.** EV_SM_DRYER_TRANSFER_EXTEND_FAILURE_ERROR (75)	Yes	SlideMaker Log *SlideMaker Reports Slide Dryer Transfer Mechanism (Shuttle to Dryer) Did Not Extend (Sensor 10).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Any completed smear will be left on the shuttle. 4. The SlideMaker stops.	The slide pusher bars (the mechanism that transfers the slide from the shuttle to the Dryer module) did not extend to transfer the slide, or the sensor did not detect the extension. This could indicate: • The slide pusher bars mechanism is jammed. • The shuttle and the slide pusher bars are misaligned. • The slide pusher bars mechanism is defective. • The slide transfer extended sensor, SEN10, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
DRYER (HIGH TEMPERATURE) **Internal Message Code, Description and No:** EV_SM_DRYER_HEATER_OVER_TEMPERATURE_FAILURE (126)	Yes	SlideMaker Log *SlideMaker Dryer Temperature Too High.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. The dryer heater is turned off. 4. Completed smears are deposited in a slide basket. 5. The SlideMaker stops.	• Error in one of these three temperature sensors and/or the truck loop: ‣ Ambient temperature thermistor on the System Control card. ‣ Heatsink temperature sensor in the heatsink assembly in the Dryer module. (See Figure 2.9-1, Dryer Module Components.) ‣ Hot air path temperature sensor on the Temperature Sensor card in the Dryer module. (See Figure 2.9-1, Dryer Module Components.) • Short circuit in dryer controller • A/D converter failure. • Dryer module fan failure.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. 3. Remove the slides from the pusher bars area, Dryer module, and platen, and place the slides in a basket for staining. Note: You may not be able to retrieve all the slides. Review the slides that were within the dryer area as they may have excessive heat damage. 4. Close the cover and turn on the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-6 Dryer Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DRYER (NO SLIDE DETECTED ON PLATEN) **Internal Message Code, Description and No:** EV_SM_NO_SLIDE_AT_PLATEN_ERROR (98)	Yes	SlideMaker Log *SlideMaker: No Slide Detected on Platen* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. The last completed smear is transferred to the Dryer module. 4. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The slide was lost sometime between when the dryer exit sensor, SEN49, detected its trailing edge, and when the gripper overextended sensor, SEN46, detected it was not present on the platen. • The slide did not fall on the platen. • The gripper overextended sensor, SEN46, is blocked. • The gripper overextended sensor, SEN46, failed. **Note:** If SEN46 is blocked or defective, the slide could be stuck on the platen.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Open the cover. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. 2. Remove the slides from the pusher bars area, Dryer module, and platen, and place the slides in a basket for staining. **Note:** You may not be able to retrieve all the slides. 3. Check the gripper overextended sensor, SEN46, for blockage. 4. If the platen is empty, check the area below the platen and in the rear track of the Basket Queue module for a fallen slide. Retrieve and place the fallen slide in a slide basket for staining. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-6 Dryer Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DRYER (PLATEN DID NOT COMPLETE MOVE) **Internal Message Code, Description and No:** EV_SM_TIMEOUT_PLATEN_ELEVATOR_ERROR (96)	Yes	SlideMaker Log *SlideMaker Platen Did Not Complete Move.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed 3. The last completed smear is transferred to the Dryer module. 4. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The elevator should take a fixed number of steps go from the low point to the high point, or from the high point to the low point. Exceeding this number of steps (by a certain margin) could indicate: • Interference in the elevator's path. • The platen elevator up sensor, SEN44, or the platen elevator down sensor, SEN45, is blocked. • SEN44 or SEN45 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. 1. Open the cover and check the Slide Elevator module: a. Check the platen and the elevator for jammed slides or any other interference in the elevator's path. b. Check the platen elevator up sensor, SEN44, and the platen elevator down sensor, SEN45, for blockage. 2. Remove the slides from the pusher bars area, Dryer module, and platen, and place the slides in a basket to dry for staining. **Note:** You may not be able to retrieve all the slides. 3. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 4. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-6 Dryer Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DRYER (PLATEN SENSORS) **Internal Message Code, Description and No:** EV_SM_ELEVATOR_SENSORS_FAILURE_ERROR (97)	Yes	SlideMaker Log *SlideMaker Elevator Sensors Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. The last completed smear remains on the shuttle. 4. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	The platen elevator up sensor, SEN44, or the platen elevator down sensor, SEN45, indicate that the elevator is both at its high point and at its low point at the same time because: • SEN44 or SEN45 is blocked. • SEN44 or SEN45 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Open the cover. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. 2. Check SEN44 and SEN45 for blockage. 3. Remove the slides from the pusher bars area, Dryer module, and platen, and place the slides in a basket for staining. **Note:** You may not be able to retrieve all the slides. 4. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. **Note:** Depending on how long the dryer was off, there may be a delay before the dryer reaches full temperature and completely dries the slides. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
DRYER (RETRACT, SENSOR 9) **Internal Message Code, Description and No:** EV_SM_DRYER_TRANSFER_RETRACT_FAILURE_ERROR (74)	Yes	SlideMaker Log *SlideMaker Reports Slide Dryer Transfer Mechanism (Shuttle to Dryer) Did Not Retract (Sensor 9).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The slide pusher bars (the mechanism that transfers the slide from the shuttle to the Dryer module) did not retract after transferring the slide, or the sensor did not detect the retraction. This could indicate: • The slide pusher bars mechanism is defective. • The slide transfer retracted sensor, SEN9, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-6 Dryer Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
DRYER (SENSORS) **Internal Message Code, Description and No:** EV_SM_SLIDE_TRANSFER_SENSOR_FAILURE_ERROR (76)	Yes	SlideMaker Log *SlideMaker Slide Transfer Sensors Obstructed Or Failed.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears within the Dryer module are dried and deposited in a slide basket. 4. The slide on the shuttle may not have been transferred to the Dryer module. 5. The SlideMaker stops.	The sensors indicate that the slide pusher bars are both retracted and extended at the same time because: • The slide transfer retracted sensor, SEN9, or the slide transfer extended sensor, SEN10, is blocked. • The slide transfer retracted sensor, SEN9, or the slide transfer extended sensor, SEN10, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle or has fallen, remove the slide. 4. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-7 Ejector Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
EJECTOR (REGISTER X RETRACT ERROR) **Internal Message Code, Description and No:** EV_SM_EJECTOR_REGISTER_X_ RETRACT_ ERROR (112)	Yes	SlideMaker Log *SlideMaker Slide Ejector (Register Retract) Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The slide pusher is retracted. 3. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 4. Any further sample in a reservoir is not processed. 5. Any completed smear will be left on the shuttle. 6. The SlideMaker stops.	The register X cylinder did not retract or did not retract far enough to engage the register X (cleared) sensor, SEN17, or SEN17 did not detect the retraction. This could indicate: • The register mechanism is jammed or binding • Register X (cleared) sensor, SEN17, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. At the MAIN MENU, select **ROUTINE FUNCTION ▸▸ UNLOCK CASSETTE** to unlock the cassette. 4. Remove the slide cassette that is in the slide ejector station. 5. Manually remove any slides from the slide ejector mechanism. 6. Close the cover. 7. Reinstall the slide cassette in the Cassette Input Queue module. 8. Acknowledge the error at the Workstation to reset the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
EJECTOR (RETRACT, SENSOR 23) **Internal Message Code, Description and No:** EV_SM_SLIDE_EJECT_BACK_ ERROR (114)	Yes	SlideMaker Log *SlideMaker Slide Ejector Did Not Retract (Sensor 23).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The slide pusher is left extended. 3. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 4. Any further sample in a reservoir is not processed. 5. Completed smears are dried and deposited in a slide basket. 6. The SlideMaker stops.	The slide pusher did not retract, or the sensor did not detect the retraction. This could indicate: • The slide pusher is jammed • The motor is defective • The slide pusher retracted sensor, SEN23, is blocked or failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. At the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ UNLOCK CASSETTE** to unlock the cassette. 4. Carefully try to remove the slide cassette that is in the slide ejector station. Check for and remove any slides, broken or stuck together. 5. Manually remove any slides or pieces of slides from the slide ejector mechanism. 6. Close the cover. 7. Reinstall the slide cassette in the Cassette Input Queue module. 8. Acknowledge the error at the Workstation to reset the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-7 Ejector Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
EJECTOR (SENSOR ERROR) **Internal Message Code, Description and No:** EV_SM_EJECTOR_SENSOR_ ERROR (118)	Yes	SlideMaker Log *SlideMaker Reports Slide Ejector Sensor Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The slide pusher is left in the last known good position. 3. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 4. Any further sample in a reservoir is not processed. 5. Completed smears are dried and deposited in a slide basket. 6. The SlideMaker stops.	The slide pusher retracted sensor, SEN23, and the slide pusher extended sensor, SEN24, indicate that the slide pusher is both retracted and extended because:. • The slide pusher retracted sensor, SEN23, or the slide pusher extended sensor, SEN24, is blocked. • SEN23 or SEN24 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. At the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ UNLOCK CASSETTE** to unlock the cassette. 4. Carefully try to remove the slide cassette that is in the slide ejector station. Check for and remove any slides, broken or stuck together. 5. Manually remove any slides or pieces of slides from the slide ejector mechanism. 6. Close the cover. 7. Reinstall the slide cassette in the Cassette Input Queue module. 8. Acknowledge the error at the Workstation to reset the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
EJECTOR (SLIDE NOT EJECTED) **Internal Message Code, Description and No:** EV_SM_EJECTOR_RETRY_ ERROR (113)	Yes	SlideMaker Log *SlideMaker Slide Not Ejected.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The slide pusher is left retracted. 3. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 4. Any further sample in a reservoir is not processed. 5. Completed smears are dried and deposited in a slide basket. 6. The SlideMaker stops.	The slide pusher attempts to dispense a slide twice before generating this error: the first attempt at high speed, the second at low. • The slide pusher is jammed. Slides may be stuck together due to humidity or a broken slide may be preventing a slide from being dispensed. • The slide pusher extended sensor, SEN24, is blocked or failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. At the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ UNLOCK CASSETTE** to unlock the cassette. 4. Carefully try to remove the slide cassette that is in the slide ejector station. Check for and remove any slides, broken or stuck together. 5. Manually remove any slides or pieces of slides from the slide ejector mechanism. 6. Close the cover. 7. Reinstall the slide cassette in the Cassette Input Queue module. 8. Acknowledge the error at the Workstation to reset the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-7 Ejector Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
EJECTOR (SLIDE NOT X REGISTERED) **Internal Message Code, Description and No**: EV_SM_SLIDE_NOT_X_ REGISTERED_ ERROR (116)	Yes	SlideMaker Log *SlideMaker Slide Ejector (X Register Extend) Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The slide pusher is left extended. 3. If the smear truck cannot pick up a slide to make a smear, the sample is not used. **Note:** Unused samples are discarded following reset. 4. Any further sample in a reservoir is not processed. 5. Completed smears are dried and deposited in a slide basket. 6. The SlideMaker stops.	The X-register mechanism did not push the slide to the left wall or the slide registered sensor, SEN25, did not sense the slide at the left wall because: • The X-register mechanism is jammed. • The slide is broken, and is too short to push the flag into the slide registered sensor, SEN25. • The flag for SEN25 is stuck. • The Z-register arm is not forceful enough to prevent the X-register arm from pushing the slide past the sensor flag spring for SEN25. • The slide registered sensor, SEN25, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. At the MAIN MENU, select ROUTINE FUNCTIONS ▸▸ UNLOCK CASSETTE to unlock the cassette. 4. Carefully try to remove the slide cassette that is in the slide ejector station. Check for and remove any slides, broken or stuck together. 5. Manually remove any slides or pieces of slides from the slide ejector mechanism. 6. Close the cover. 7. Reinstall the slide cassette in the Cassette Input Queue module. 8. Acknowledge the error at the Workstation to reset the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-8 Fluidics Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
FLUIDICS (CALIBRATE) **Internal Message Code, Description and No:** EV_SM_CALIBRATE_FLUID_ DETECTORS_ ERROR (86)	Yes	SlideMaker Log *SlideMaker Fluid Detector Calibration Is Required.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity except when in Service mode.	At initialization time, the table containing the calibration value (gain) for the fluid detectors contains invalid values.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative. 3. **Service Only:** Recalibrate the fluid detectors as instructed under Heading 4.9.
FLUIDICS (DETECTOR 1) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR1_FAULT_ERROR (87)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 1 Failure.* For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD1 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
FLUIDICS (DETECTOR 2) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR2_FAULT_ERROR (88)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 2 Failure.* For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD2 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
FLUIDICS (DETECTOR 3) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR3_FAULT_ERROR (89)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 3 Failure.* For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD3 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-8 Fluidics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION		RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**		**SlideMaker Status**	**Probable Cause**	**Corrective Action**
FLUIDICS (DETECTOR 4) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR4_FAULT_ERROR (90)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 4 Failure.*	 For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD4 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
FLUIDICS (DETECTOR 5) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR5_FAULT_ERRO (91)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 5 Failure.*	 For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD5 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
FLUIDICS (DETECTOR 6) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR6_FAULT_ERROR (92)	No, if warning Yes, if error	SlideMaker Log *SlideMaker Fluid Detector 6 Failure.*	 For the first two failures during blood flow, yellow light. For the third failure in a row during blood flow, or the first failure during backwash, red light.	The sample is discarded. If three consecutive failures occur during aspiration, or if this failure occurs during backwash: 1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD6 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
FLUIDICS (DETECTOR 7) **Internal Message Code, Description and No.** EV_SM_FLUID_DETECTOR7_FAULT_ERROR (93)	Yes	SlideMaker Log *SlideMaker Fluid Detector 7 Failure.*	 If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD7 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-8 Fluidics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
FLUIDICS (DETECTOR 8) **Internal Message Code, Description and No:** EV_SM_FLUID_DETECTOR8_FAULT_ERROR (94)	Yes	SlideMaker Log *SlideMaker Fluid Detector 8 Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. A smear may be made on one of the samples in a reservoir. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• Fluid detector FD8 is defective. • A fluidics problem	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. **Service Note:** The instrument automatically recalibrates FL1 through FL8. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-9 Pneumatics Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (5 PSI SUPPLY) **Internal Message Code, Description and No:** EV_SM_5_PSI_SUPPLY_FAILURE (23)	Yes	SlideMaker Log *SlideMaker 5 PSI Out Of Range Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	1. 5 psi regulator is misadjusted. If it was set too high, it could have ruptured the diaphragm. 2. Pressure leak, most likely from a disconnected line. 3. Pneumatic Supply Monitor, 5-Psi card failure 4. A/D converter error or failure	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check the 5 psi: a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**. b. While monitoring the 5-psi reading on the screen, adjust the 5-psi regulator, REG1. c. If the message persists, check for a 5-psi leak. 2. If the message persists: a. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Check the area below the smear truck for fallen slides and retrieve the slides if possible. c. Close the cover and turn on the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-9 Pneumatics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (30 PSI SUPPLY) **Internal Message Code, Description and No.:** EV_SM_30_PSI_SUPPLY_ FAILURE (24)	Yes	SlideMaker Log *SlideMaker 30 PSI Out Of Range Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	1. 30 psi out of range: either loss of pressure or excessive pressure from the pneumatic pump (PM1) in the Analytical Station's Power Supply. • Loss of pressure occurs if the 30 psi line to the SlideMaker is disconnected or if the pneumatic pump fails. • Excessive pressure occurs if the 30 psi regulator (RG1) in the Power Supply is set too high or if the diaphragm in RG1 is ruptured. 2. Pneumatic Supply Monitor, 30-Psi card failure. 3. A/D converter error or failure	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check the 30 psi: a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**. b. While monitoring the 30- psi reading on the screen, check for a 30-psi leak. 2. If the message persists: a. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Check the area below the smear truck for fallen slides and retrieve the slides if possible. c. Close the cover and turn on the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-9 Pneumatics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (LOW VACUUM 1) **Internal Message Code, Description and No:** EV_SM_LOW_PRESSURE_ SUPPLY_FAILURE (25)	Yes	SlideMaker Log *SlideMaker Low Vacuum Out Of Range Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	1. 17.5 in. Hg vacuum misadjusted 2. Vacuum leak 3. Pneumatic Supply Monitor, 17.5-in. Hg card failure 4. A/D converter failure or error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check the 17.5 in. Hg vacuum: a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES.** b. While monitoring the 17.5-in. Hg vacuum reading on the screen, adjust the 17.5-in. Hg vacuum regulator, REG1. c. If the message persists, check for a vacuum leak. 2. If the message persists: a. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Check the area below the smear truck for fallen slides and retrieve the slides if possible. c. Close the cover and turn on the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears can contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-9 Pneumatics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (LOW VACUUM 2) **Internal Message Code, Description and No:** EV_SM_LOW_VACUUM_SUPPLY_FAILURE (26)	Yes	SlideMaker Log *SlideMaker Low Vacuum Out Of Range Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	1. 6.5 in. Hg vacuum misadjusted 2. Vacuum leak 3. Pneumatic Supply Monitor, 6.5-in. Hg card failure 4. A/D converter failure or error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check the 6.5 in. Hg vacuum: a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**. b. While monitoring the 6.5-in. Hg vacuum reading on the screen, adjust the 6.5-in. Hg vacuum regulator, REG2. c. If the message persists, check for a vacuum leak. 2. If the message persists: a. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Check the area below the smear truck for fallen slides and retrieve the slides if possible. c. Close the cover and turn on the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-9 Pneumatics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (NO HIGH VACUUM) **Internal Message Code, Description and No.:** EV_SM_HIGH_VACUUM_SUPPLY_FAILURE (27)	Yes	SlideMaker Log *SlideMaker High Vacuum Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow ligh.t If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity	1. Vacuum leak 2. Loss of vacuum from the pneumatic pump (PM1) in the Analytical Station's Power Supply 3. Pneumatic Supply Monitor, Vacuum card failure 4. A/D converter failure or error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Check the high, unregulated vacuum: a. From the MAIN MENU, select **ROUTINE FUNCTIONS ▸▸ PNEUMATIC/POWER SUPPLIES**. b. While monitoring the high vacuum reading on the screen, check for a high vacuum leak. 2. If the message persists: a. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. b. Check the area below the smear truck for fallen slides and retrieve the slides if possible. c. Close the cover and turn on the SlideMaker. 3. If the message still persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. **WARNING** Risk of contamination. The prepared smears contain biohazardous material. Handle with care and avoid skin contact. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-9 Pneumatics Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PNEUMATICS (VACUUM ACCUMULATOR FULL OF LIQUID) **Internal Message Code, Description and No.** EV_SM_CLEANING_AGENT_NOT_FULL_ERROR (78)	Yes	SlideMaker Log *SlideMaker Vacuum Accumulator Full Of Liquid* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity and the Dryer module heater is turned off.	This error should not occur during normal operation because the vacuum accumulator is emptied during the Startup cycle and any time the SlideMaker is turned off and on. To clear this error: 1. The Analyzer grants the SlideMaker permission to empty the vacuum accumulator. 2. The SlideMaker empties the vacuum accumulator until the vacuum reservoir sensor, SEN51, indicates the reservoir is not full or until 30 seconds has elapsed. **Note:** The vacuum accumulator is then completely emptied over a fixed time period. If the 30 second timeout occurs, it could indicate: • The vacuum reservoir sensor, SEN51, is defective. • The vacuum accumulator drain solenoid, SOL63, is defective.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. If AutoStop is OFF, press **STOP** on the Diluter keypad to stop theAnalytical Station. 2. After the Diluter goes to an idle state, wait until the SlideMaker empties the vacuum accumulator and the SlideMaker screen displays READY. 3. Press **START/CONT** on theAnalytical Station to resume normal operation. 4. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-10 Power Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
POWER (2.5V SUPPLY) **Internal Message Code, Description and No:** EV_SM_2_5V_SUPPLY_FAILURE (15)	Yes	SlideMaker Log *SlideMaker 2.5V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	• Power supply failure or short circuit • A/D converter error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
POWER (5V SUPPLY) **Internal Message Code, Description and No:** EV_SM_5V_SUPPLY_FAILURE (16) **Note:** If event severe, this message may not appear.	No	SlideMaker Log *SlideMaker 5V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	• If the 5 V supply is out of tolerance but >4.5 V minimum reset threshold, the SlideMaker stops all mechanical activity and displays a message. • If the 5 V supply is less than the minimum reset thresholds, the SlideMaker presents no signs of operation to the operator.	• Power supply failure or short circuit • A/D converter failure	1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-10 Power Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
POWER (10V REFERENCE) **Internal Message Code, Description and No:** EV_SM_10V_REFERENCE_ FAILURE (17)	Yes	SlideMaker Log *SlideMaker 10V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	• Power supply failure or short circuit • A/D converter error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
POWER (-15V SUPPLY) **Internal Message Code, Description and No:** EV_SM_MINUS_15V_SUPPLY_ FAILURE (20)	Yes	SlideMaker Log *SlideMaker -15V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	• Power supply failure or short circuit • A/D converter error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-10 Power Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
POWER (15V SUPPLY) **Internal Message Code, Description and No:** EV_SM_15V_SUPPLY_FAILURE (18)	Yes	SlideMaker Log *SlideMaker 15V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	• Power supply failure or short circuit • A/D converter error	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
POWER (24V SUPPLY) **Internal Message Code, Description and No:** EV_SM_24V_SUPPLY_FAILURE (19)	Yes	SlideMaker Log *SlideMaker 24V Supply Out Of Tolerance Or Not Present.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity. **Service Only:** Since +24 V supply powers all of the solenoids, all of the solenoids are turned off.	• Power supply failure or short circuit • A/D converter error	**Note:** If the alarm sounds, press any key on the SlideMaker screen to reset it. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-10 Power Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
POWER (PROCESSOR A) **Internal Message Code, Description and No:** EV_SM_PROC_A_VPP_FAILURE (21)	Yes	SlideMaker Log *SlideMaker Reports Processor 'A' VPP Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity. **Service Only:** Processor "A" writes to the flash memory when a new version is being downloaded, or when calibration parameters are to be stored.	Power supply failure or short circuit	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 2. Open the cover. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
POWER (PROCESSOR B) **Internal Message Code, Description and No.** EV_SM_PROC_ B_VPP_ FAILURE (22)	Yes	SlideMaker Log *SlideMaker Reports Processor 'B' VPP Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity. **Service Only:** Processor "B" writes to the flash memory when a new version is being downloaded.	Power supply failure or short circuit	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

Table 7.2-11 Printer Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PRINTER (CRC) **Internal Message Code, Description and No:** EV_SM_PRINTER_COMM_ ERROR (07)	Yes	SlideMaker Log *SlideMaker Label Printer Communication Lost (CRC Check).* If AutoStop is OFF, yellow light. If AutoStop is ON, red ligh.t	1. No new samples are aspirated. 2. If a sample's label is not printed, the sample is not used. 3. Completed smears are dried and deposited in a slide basket.	Three consecutive failures to communicate with the Label Printer.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off and then on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
PRINTER (FAILURE) **Internal Message Code, Description and No.:** EV_SM_PRINTER_FAILURE (31)	Yes	SlideMaker Log *SlideMaker Label Printer Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If a sample's label is not printed, the sample is not used. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	Label Printer module detected a failure in operation.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off and then on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
PRINTER (INITIALIZATION) **Internal Message Code, Description and No:** EV_SM_PRINTER_RESET_ ERROR (37)	Yes	SlideMaker Log *SlideMaker Label Printer Initialization Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	Problem with the Label Printer module at initialization due to: • Memory checksum failure. • RAM memory failure.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
PRINTER (NO COMMUNICATION) **Internal Message Code, Description and No:** EV_SM_NO_PRINTER_COMMUNICATION (08)	No	SlideMaker Log *Label Printer Communication Timeout.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If a sample's label is not printed, the sample is not used. 3. Completed smears are dried and deposited in a slide basket.	No response from the Label Printer module, or handshake signals are absent for too long.	1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off and then on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
PRINTER (OUT OF LABELS) **Internal Message Code, Description and No.:** EV_SM_PRINTER_OUT_OF_LABELS_ERROR (33)	Yes	SlideMaker Log *SlideMaker Label Printer Out Of Labels.* Red light	1. No new samples are aspirated. 2. Any sample in a reservoir is processed to a smear. **Note:** The Label Printer module has up to two labels available when it senses the roll is out of labels. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	Label Printer module detected two successive missing labels. • The label roll is empty. • Labels are missing from the label roll.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover and check the label roll: • If the label roll is missing a few labels, move the label dispenser until more labels are available. • If the label roll is empty, replace the roll. Refer to the Replacing the SlideMaker Label Roll procedure in the Online Help system. 3. Close the cover and acknowledge the error at the Workstation to initialize the printer and continue operation of the SlideMaker.

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Table 7.2-11 Printer Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
PRINTER (OUT OF RIBBON) **Internal Message Code, Description and No.:** EV_SM_PRINTER_RIBBON_OUT_ERROR (34)	Yes	SlideMaker Log *SlideMaker Label Printer Out Of Ribbon.* Red light	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. **Note:** The Label Printer module still has printing capacity for up to two labels when it senses the ribbon is out. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity	Label Printer module detected that ribbon is out.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover and replace the printer ribbon. Refer to the Replacing the SlideMaker Printer Ribbon procedure in the Online Help system. 3. Close the cover and acknowledge the error at the Workstation to initialize the printer and continue operation of the SlideMaker.
PRINTER (TEMPERATURE) **Internal Message Code, Description and No.:** EV_SM_PRINTHEAD-TEMP_EXCEEDED (35)	Yes	SlideMaker Log *SlideMaker Label Printer Temperature Exceeded.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. If a sample's label is not printed, the sample is not used. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	Elevated printhead temperature. **Service Only:** Continuous operation may elevate the printhead temperature.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off, wait approximately 30 minutes, then turn the SlideMaker on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
PRINTER (TOP OF FORM) - **GEN•S SM SlideMaker only** **Internal Message Code, Description and No.** EV_SM_PRINTER_TOP_OF_FORM_ERROR (36)	Yes	SlideMaker Log *SlideMaker Label Printer Top Of Form Not Detected.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	1. Top-of-form is not within allowable distance. Most likely caused by labels jammed in the top-of-form sensor. 2. Three consecutive labels not found during initialization of the Printer. 3. Printer motor failure	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. 3. Check the top-of-form sensor and remove any labels stuck on the sensor. 4. Close the cover, acknowledge the error at the Workstation to initialize the printer and continue operation of the SlideMaker 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-12 Reagent Error Messages

SLIDEMAKER		WORKSTATION			RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**			**SlideMaker Status**	**Probable Cause**	**Corrective Action**
REAGENT (REAGENT TANK NOT FULL) **Internal Message Code, Description and No:** EV_SM_LOCAL_ISOTON_NOT_FULL_ERROR (77)	Yes	SlideMaker Log *SlideMaker Reagent Tank Not Full.*		If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	If this error appears when the reagent tank is pulling diluent: 1. No new samples are aspirated. 2. Any sample in a reservoir is processed. 3. Backwashing may fail (depending on amount of diluent in the tank). 4. Completed smears are dried and deposited in a slide basket. 5. The SlideMaker stops all mechanical activity because the SlideMaker cannot run without diluent. If this error appears when the reagent tank is pulling cleaning agent: • All operations except shutdown continue normally. • Shutdown cannot be done until the reagent tank can fill with cleaning agent.	After trying to fill the reagent tank for 15 seconds, the reagent full sensor, SEN47, indicates the tank is not full because: • No reagent is being pulled into the tank. **Note:** Since the diluent and cleaning agent share the same reservoir, the reservoir sensor only reports on the level of the reagent in the reservoir, not on the kind of reagent. • Reagent supply (diluent or cleaning agent) empty. • The reagent full sensor, SEN47, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Ensure the reagent lines are connected to the reagent containers. 2. If the message occurs during a Startup or a normal operating cycle, the diluent supply is low. a. Replace the diluent container. Follow the Replacing Reagent Containers procedure in the Online Help system for the message that appears on the Analytical Station. b. Do a SlideMaker Startup cycle to prime the diluent lines. Select **MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN START UP**. 3. If the message occurs during a Shutdown cycle, the cleaning agent is low. a. Replace the cleaning agent container. Follow the Replacing Reagent Containers procedure in the Online Help system for the message that appears on the Analytical Station. b. Do a SlideMaker Shutdown cycle to prime the cleaning agent lines. Select **MAIN MENU ▸▸ ROUTINE FUNCTIONS ▸▸ ROUTINE FLUIDICS ▸▸ RUN SHUT DOWN**. 4. If the message persists, call your Beckman Coulter Representative.
REAGENT (WASTE FULL) **Internal Message Code, Description and No.:** EV_SM_HOST_WASTE_FULL_ERROR (30)	No	SlideMaker Log *Analytical Station Waste Full.*	N/A	Red light	1. No new samples are aspirated. 2. Any sample in a reservoir is processed to a smear. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker is ready.	Analytical Station detected full waste container.	Replace the waste container at the Analytical Station. Follow the Replacing Waste Container procedure in the Online Help system for the message that appears on the Analytical Station.

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Table 7.2-13 Shuttle Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
SHUTTLE (CALIBRATE) **Internal Message Code, Description and No:** EV_SM_CALIBRATE_SHUTTLE_ERROR (67)	Yes	SlideMaker Log *SlideMaker Shuttle Calibration Required.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity, except for Service mode.	At initialization, either the shuttle has never been calibrated (a new flash memory chip) or the values are lost.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative. 3. **Service Only:** Set the home, printer and dispense offset values as instructed under Heading 4.3.
SHUTTLE (NOT AT DISPENSE, SENSOR 7) **Internal Message Code, Description and No:** EV_SM_BLOOD_DEPOSITION_SENSOR_ NOT_FOUND (69)	Yes	SlideMaker Log *SlideMaker Shuttle Not At Dispense Position (Sensor 7).* If AutoStop is OFF, yellow light. IIf AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• A jam in the shuttle prevents the shuttle from reaching the dispense position. • The dispense position sensor, SEN7, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove the slide if it is labeled or has blood on it. 4. Remove any slides that have fallen or are jamming the shuttle. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
SHUTTLE (NOT AT PRINTER, SENSOR 5) **Internal Message Code, Description and No.** EV_SM_PRINTER_POSITION_ NOT_FOUND_ ERROR (68)	Yes	SlideMaker Log *SlideMaker Shuttle Not At Label Printer Position (Sensor 5).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	• A jam in the shuttle prevents the shuttle from reaching the printer position. • The printer position sensor, SEN5, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove the slide if it is labeled or has blood on it. 4. Remove any slides that have fallen or are jamming the shuttle. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-13 Shuttle Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
SHUTTLE (NOT AT SMEAR, SENSOR 6) **Internal Message Code, Description and No:** EV_SM_SHUTTLE_POSITION_NOT_FOUND_ ERROR (70)	Yes	SlideMaker Log *SlideMaker Shuttle Not At Smear Position (Sensor 6).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Any completed smears remain on the shuttle. 4. The SlideMaker stops.	• A jam in the shuttle prevents the shuttle from reaching the home (smear) position. • The smear position sensor, SEN6, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove the slide if it is labeled or has blood on it. 4. Remove any slides that have fallen or are jamming the shuttle. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
SHUTTLE (SENSORS) **Internal Message Code, Description and No:** EV_SM_POSITION_SENSOR_FAILURE_ ERROR (71)	Yes	SlideMaker Log *SlideMaker Shuttle Position Sensors Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	More than one shuttle position sensor (printer position sensor, SEN5; dispense position sensor, SEN7; or smear position sensor, SEN6) is active at a time because: • A sensor is blocked. • A sensor failed. The most likely condition is that when the shuttle is near the printer position or the dispense position, the shuttle belt swings through the smear position sensor.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn the SlideMaker off and then on. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
SHUTTLE (VACUUM, SENSOR 4) **Internal Message Code, Description and No:** EV_SM_SHUTTLE_BED_VACUUM_ FAILURE_ ERROR (72)	Yes	SlideMaker Log *SlideMaker Shuttle Bed Vacuum Failure (Sensor 4).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is not processed. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	Failure to detect vacuum when passing a slide from the smear truck to the shuttle could indicate: • An improperly placed slide or debris on the shuttle prevents the necessary seal. • The shuttle vacuum sensor, SEN4, is defective. • The shuttle vacuum supply solenoid is defective. Failure to release the vacuum to transfer the slide to the Dryer module could indicate the shuttle vacuum supply solenoid is defective.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. If a slide is on the shuttle, remove the slide. If the slide is a labeled smear, set it aside for staining. 4. Carefully wipe the shuttle with a lint-free tissue. 5. Remove any fallen slides. 6. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 7. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-14 Truck Error Messages

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (DID NOT COMPLETE MOVE) **Internal Message Code, Description and No:** EV_SM_SERVO_TIMEOUT_ERROR (47)	Yes	SlideMaker Log *SlideMaker Truck Did Not Complete Move.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The sample in the reservoir is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket.	Every truck operation has a 6 second timeout value that is greater than the time required to perform the operation. If the operation is not completed within the allocated time, a timeout error occurs. This could indicate the truck motor: • Slipped. • Jammed. • Failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Remove the slide cassette from the slide ejector station. 4. Remove any glass slides or pieces of slides from slide ejector mechanism. 5. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 6. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 7. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 8. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (FORWARD, SENSOR 2) **Internal Message Code, Description and No:** EV_SM_FORWARD_LIMIT_NOT_FOUND_ ERROR (41)	Yes	SlideMaker Log *SlideMaker Truck Forward Motion (Sensor 2).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	At truck initialization: • Truck is jammed or binding • Encoder failed • Truck motor failed. • Truck forward limit sensor, SEN2, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (INDEX NOT FOUND) **Internal Message Code, Description and No:** EV_SM_INDEX_ POSITION_ NOT_FOUND (43)	Yes	SlideMaker Log *SlideMaker Truck Index Position Not Found.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	At initialization, both polarities of the encoder are tried in an effort to find the index position. This error is generated if trying both polarities of the encoder does not find the index position, possibly indicating: • An encoder failed. • The truck motor failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (INITIALIZATION) **Internal Message Code, Description and No.:** EV_SM_SERVO_RESET_ERROR (48)	Yes	SlideMaker Log *SlideMaker Truck Initialization Failure.* If AutoStop is OFF, yellow light. IIf AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	When initializing the truck, three successive attempts were made to perform a hardware and software initialization of the truck controller chip and all three attempts failed. This could indicate the System Control card failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (INVALID COMMAND) **Internal Message Code, Description and No:** EV_SM_SERVO_COMMAND_ERROR (46)	Yes	SlideMaker Log *SlideMaker Truck Received An Invalid Command.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The sample in the reservoir is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket.	An invalid command was sent by processor “A” to the truck controller. This indicates an error in: • Processor “A.” • Outputs of processor “A.” • truck controller.	1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.
TRUCK (LIMIT SENSOR) **Internal Message Code, Description and No:** EV_SM_SERVO_LIMIT_SENSOR_ ERROR (42)	Yes	SlideMaker Log *SlideMaker Truck Sensor Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	When either the truck reverse or the truck forward limit sensor was reached, the other sensor also indicated it was blocked, probably indicating: • Truck reverse limit sensor, SEN1, failed. • truck forward limit sensor, SEN2, failed.	1. Turn off the SlideMaker. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 4. Close the cover and turn on the SlideMaker. 5. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Open the cover and remove the slides from the pusher bars area, Dryer module, and platen, and place them in a slide basket for staining. **Note:** You may not be able to retrieve all the slides. d. Close the cover and call your Beckman Coulter Representative.

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Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (NOT AT CLEARANCE POSITION) **Internal Message Code, Description and No:** EV_SM_SERVO_CLEARANCE_POSITION_ NOT_FOUND_ERROR (51)	Yes	SlideMaker Log *SlideMaker Truck Not At Clearance Position.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	When traveling to the clearance position, the smear truck ended at a position greater than ±0.050 in.of the desired position. The first time this occurs, the smear truck tries again. If it fails on the second attempt, this error is generated. Cause unknown.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 4. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (NOT AT PICK POSITION) **Internal Message Code, Description and No:** EV_SM_PICK_POSITION_NOT_ FOUND_ ERROR (50)	Yes	SlideMaker Log *SlideMaker Truck Not At Pick Position.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	When traveling to the pick position, the smear truck ended at a position greater than ±0.050 in. of the desired position. The first time this occurs, the smear truck moves to the clearance position and tries again. If it fails on the second attempt, this error is generated. Cause unknown.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Remove the slide cassette from the slide ejector station. 4. Remove any glass slides or pieces of slides from slide ejector mechanism. 5. Check the slide on the shuttle. Discard that slide if it is labeled or has blood on it. 6. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 7. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (NOT AT PLACEMENT POSITION) **Internal Message Code, Description and No:** EV_SM_PLACEMENT_POSITION_NOT_FOUND_ERROR (52)	Yes	SlideMaker Log *SlideMaker Truck Not At Placement Position* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	When traveling to the placement position, the smear truck ended at a position greater than ±0.050 in.of the desired position. The first time this occurs, the smear truck moves to the clearance position and tries again. If it fails on the second attempt, this error is generated. Cause unknown.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 4. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (NOT AT WICK POSITION) **Internal Message Code, Description and No.** EV_SM_SERVO-WICK POSITION_NOT_FOUND_ERROR (53)	Yes	SlideMaker Log *SlideMaker Truck Not At Wick Position.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops all mechanical activity.	When traveling to the wick position, the smear truck ended at a position greater than ±0.050 in.of the desired position. Cause unknown.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 4. Check the area below the smear truck for fallen slides and retrieve if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (NOT CALIBRATED) **Internal Message Code, Description and No:** EV_SM_CALIBRATE_SERVO_ERROR (39)	Yes	SlideMaker Log *SlideMaker Truck Calibration Required.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity except when in the Service mode.	The truck calibration values for the pick and wick locations are missing at initialization.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative. 3. **Service Only:** Reset the pick and wick positions as instructed under Heading 4.4.
TRUCK (NOT DOWN ERROR) **Internal Message Code, Description and No:** EV_SM_TRUCK_NOT_DOWN_ERROR (120)	Yes	SlideMaker Log *SlideMaker Reports Slide Truck Down Position Error.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The truck position is checked when the slide is placed on the shuttle. This error is generated if the truck lift down sensor, SEN19, does not indicate the truck lift is up. • Truck lift cylinder failed • Truck lift down sensor, SEN19, failed	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 4. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative

Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (NOT UP ERROR) **Internal Message Code, Description and No:** EV_SM_TRUCK_NOT_UP_ERROR (119)	Yes	SlideMaker Log *SlideMaker Reports Slide Truck Up Position Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The truck position is checked after the slide is placed on the shuttle. This error is generated if the truck lift up sensor, SEN18, does not indicate the truck lift is up. • Truck lift cylinder failed • Truck lift up sensor, SEN18, failed	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Check the slide on the shuttle and remove that slide if it is labeled or has blood on it. 4. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 5. Close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 6. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative
TRUCK (POSITION ERROR) **Internal Message Code, Description and No.** EV_SM-SERVO_EXCESSIVE_POSITION_ERROR (44)	Yes	SlideMaker Log *SlideMaker Truck At Improper Position (Sensors 58, 59, 60).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. The sample in the reservoir is not used. **Note:** Unused samples are discarded following reset. 3. Completed smears are dried and deposited in a slide basket.	The actual position of the truck differs from the desired position more than ±0.25 in. This can be caused by: • Interference with truck motion. • Encoder failure.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Remove the slide cassette from the slide ejector station. 4. Remove any glass slides or pieces of slides from slide ejector mechanism. 5. Check the slide on the shuttle and discard that slide if it is labeled or has blood on it. 6. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 7. Check the smear truck for a slide. a. If the smear truck is holding a slide: 1) Turn off the SlideMaker. The smear truck drops the slide. 2) Retrieve the fallen slide. 3) Close the cover and turn on the SlideMaker. b. If the smear truck is empty, close the cover and acknowledge the error at the Workstation to reset the SlideMaker. 8. If the message persists a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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Table 7.2-14 Truck Error Messages *(Continued)*

SLIDEMAKER		WORKSTATION	RECOVERY		
View Error Screen Message	**Alarm**	**Log Message and Icons on Command Center**	**SlideMaker Status**	**Probable Cause**	**Corrective Action**
TRUCK (REVERSE, SENSOR 1) **Internal Message Code, Description and No:** EV_SM_REAR_LIMIT_NOT_FOUND_ERROR (40	Yes	SlideMaker Log *SlideMaker Truck Reverse Motion (Sensor 1).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	The SlideMaker stops all mechanical activity.	At truck initialization: • Truck is jammed or binding • Encoder failed • Truck motor failed. • Truck reverse limit sensor, SEN1, failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Acknowledge the error at the Workstation to reset the SlideMaker. 2. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (SENSOR ERROR) **Internal Message Code, Description and No:** EV_SM_TRUCK_LIFT_SENSOR_ ERROR (121)	Yes	SlideMaker Log *SlideMaker Reports Slide Truck Sensor Failure.* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket. 4. The SlideMaker stops.	The truck lift up sensor, SEN18, and the truck lift down sensor, SEN19, indicate the smear truck is both up and down. SEN18 or SEN19 failed.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Acknowledge the error at the Workstation to reset the SlideMaker. 3. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.
TRUCK (VACUUM, SENSOR 3) **Internal Message Code, Description and No:** EV_SM_SERVO_TRUCK_ VACUUM_ FAILURE_ERROR (49)	Yes	SlideMaker Log *SlideMaker Truck Vacuum Out Of Tolerance (Sensor 3).* If AutoStop is OFF, yellow light. If AutoStop is ON, red light.	1. No new samples are aspirated. 2. Any sample in a reservoir is discarded. 3. Completed smears are dried and deposited in a slide basket.	• The truck is not properly located over a slide. • Vacuum has not been applied. • Vacuum is too low. • The truck vacuum sensor, SEN3, failed. • Debris is impeding the establishment of vacuum.	**Note:** Press any key on the SlideMaker screen to reset the alarm. 1. Wait until the last slide in the Dryer module is deposited in a slide basket. 2. Turn off the SlideMaker and open the cover. **WARNING** Risk of personal injury and contamination. The slide processing areas can contain prepared smears and/or broken glass with biohazardous material. Handle with care and avoid skin contact. 3. Remove the slide cassette from the slide ejector station. 4. Remove any glass slides or pieces of slides from slide ejector mechanism. 5. Remove any slide on the shuttle and wipe the shuttle with a clean tissue to remove any debris. 6. Check the area below the smear truck for fallen slides and retrieve the slides if possible. 7. Place the slide cassette back in the Cassette Input Queue module. 8. Close the cover and turn on the SlideMaker. 9. If the message persists: a. Turn off the SlideMaker. b. If AutoStop is ON, turn AutoStop OFF to resumeAnalytical Station operation. Samples that require slides appear in the Slide List. c. Call your Beckman Coulter Representative.

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7.3 TROUBLESHOOTING TIPS FOR THE SLIDE AND SMEAR MODULE

Troubleshooting Blood Smear Quality Problems

The quality of the blood smear is determined by:

- Surface conditions of the slide.
- Performance of the Smear, Sample Access and Reservoir, and Dryer modules.

For the smear specifications, refer to the User's manual or the Online Help System.

Troubleshooting Smear Module Alignment Problems

The Smear module is integrated with the Slide Ejector module, the Dryer module and the Dispense module into one slide transport frame. Each module must be mounted accurately for the Smear module to perform correctly. The mounting of the:

- Slide Ejector module affects the position of the ejected slide which affects:
  - The ability of the smear truck to pick up the slide.
  - The alignment between the spreader slide and the smear slide.
- Dispense module affects the positioning of the blood drop on the slide.
- Dryer module affects the positioning of the smeared slide on the conveyer belt in the Dryer module.

Troubleshooting the Servo System

Two test points are available on the System Control card to assist in troubleshooting the servo system.

- Ground the test point TP64 to inhibit all servo motor operation.

WARNING Operator injury and/or instrument damage may result from very high smear truck speeds and no braking input. Remove the motor from the smear assembly before grounding TP65 and the limit sensors to troubleshoot the servo system.

- Ground the test point TP65 to run the motor in an open loop mode to verify motor commutation and drive circuitry functions. Note that you must also ground the limit sensor inputs to disable braking.

7.4 SOFTWARE INSTALLATION ERRORS

Table 7.4-1 lists the errors messages and recommended actions for problems encountered while installing SlideMaker software.

Table 7.4-1 Software Installation Errors

Error Message	Description	Corrective Action
LANGUAGE SUPPORT TOOL VERSION IS INCOMPATIBLE WITH SYSTEM SOFTWARE	Flash memory "B" data file version was incompatible with processor "B" software. Flash memory "B" screen and message data compressed format was not recognized by the decode task.	Download the SlideMaker software from the Workstation.
ERROR: XY BAD CRC	Flash memory CRC check error. • A non-zero "X" indicates flash memory "A" has an error condition. Bit 0, 1, and 2 indicate table "A," code "A," and code "B" CRC check sum results. (1= fail) • A non-zero "Y" indicates flash memory "B" has an error condition. Bit 0 and 1 indicate "B" screen data and "B" message data CRC check sum results. (1= fail)	1. Download the SlideMaker software from the Workstation. 2. If error recurs, replace the System card and the flash memory device.
PLEASE DOWNLOAD LST OUTPUT FILE(S) THERE IS NO SCREEN INFORMATION IN MEMORY	"B" flash memory is blank, or loaded data was not screen information.	Download the SlideMaker software "B" flash memory screens data and "B" flash memory messages data from the Workstation.
SELF TESTING	Normally displayed for about 3 seconds during the self test, then the SlideMaker initializes itself and begins running. If this message remains on the screen indefinitely, it indicates a problem.	Check the LEDs on the System card. If the left three are blinking at the same time, ensure the jumpers on J7 System card are set correctly. See System Control Card, Jumpers, under Heading A.2.

8 PARTS LISTS, 8.1-1

8.1 MASTER PARTS LIST, 8.1-1

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8.1 MASTER PARTS LIST

The components in the master parts list are listed alphabetically by common name or generic category. Table 8.1-1 further defines the categories used, and references the table in this section where those components appear. Where applicable, a component is cross referenced to its illustration in Heading 8.2.

Table 8.1-1 Common Categories Used in Master Parts List

Category	Category Includes	Table
Cable	All electrical wiring.	8.1-3
Chamber	All liquid, vacuum, and pressure chambers, including tanks and foam traps.	8.1-3
Chokes	Any liquid or air-flow restrictor except tubing restrictors (categorized under tubing) and choke fittings (categorized under fittings).	8.1-3
Consumable	All customer billable parts such as adhesives, alcohol, slide cassettes, grease, and tape.	8.1-3
Cover	All non-hinged panels, circuit card covers, and component covers.	8.1-3
Custom Part	Miscellaneous components not easily categorized by a common name. On the SlideMaker this includes the slide-retaining arm on the platen, and the finger (hammer) on the X-register arm.	8.1-3
Cylinder	All cylinders, air or oil.	8.1-3
Display	Any display screen.	8.1-4
Door	All hinged panels.	8.1-4
Fan	Fan guards and fans.	8.1-4
Filter	Air fluid barrier, air water separators, and air filters.	8.1-4
Fitting	Includes choke, elbow, feed-thru, muffler, plug, quick-disconnect, T-, union and Y-fittings.	8.1-4
Fuse	Fuse holder and fuses.	8.1-5
Hardware	Miscellaneous hardware including brackets, guides, clips, hinges, knobs, latches, mounts, plates, standoffs and studs. Does not include fittings, nuts, screws, and washers which are listed as separate categories.	8.1-6
Module	Assemblies that contain all of the components for performing a specific instrument function and that are designed to be removed as a unit for servicing.	8.1-6
PCB	All printed circuit cards.	8.1-7
Pump	All liquid pumps and dispensers.	8.1-7
Regulator	All pressure and vacuum regulators.	8.1-8
Screw	All screws, including thumbscrews and setscrews.	8.1-8
Switch	All types including button, float, magnetic, micro and opto.	8.1-8
Tie wrap	Nylon, loop and clamp tie wraps and tie wrap adhesives.	8.1-9
Tool	Tool box and all tools needed for servicing the SlideMaker.	8.1-9
Tubing	All tubing, including standard, custom, I-beam, restrictor, and shielded input lines; and tubing collars and sleeves.	8.1-9
Valve	All valves, including check, pinch, and solenoid; and valve deactivator clips.	8.1-10
Washer	Washers and spacers.	8.1-10

Table 8.1-2 Master Parts List, A and B

Description	Part Number	Figure	Item
Actuator, valve, pilot piston, pneumatic, 11.6 lb, brass	6232447	8.2-5	8
Actuator, valve, pilot, 7/16 bore, nickel plated	6211015	8.2-5 8.2-7 8.2-10 8.2-12 8.2-20	5 3 7 25 6
Basket, slide, molded (compatible with the SlideStainer)	6806894		
Bearing, roller, assembly	2523625	8.2-6	4
Belt, conveyer, CP	1023108	8.2-6	1
Belt, drive inner basket transport	2527696	8.2-2	5
Belt, outer drive basket transport	2527695	8.2-2	10
Belt, timing 40 DP, 97.828 cm (38.515 in.) L	2527726	8.2-12	19
Bridge, slide pickup	1024095	8.2-3	8
Brush assembly	6806079	8.2-12	18
Bumper, foot	3908015		
Bushing (two each)	2527850	8.2-3	9

Table 8.1-3 Master Parts List, C

Description	Part Number	Figure	Item
Cable assembly, 6-position, 51 cm (20 in.) L	6028862	8.2-8	3
Cable assembly, basket cover interlock sensor, SEN54	6028835	8.2-2	9
Cable assembly, Basket Queue module sensor, SEN37	6028841	8.2-2	13
Cable assembly, Basket Queue module sensor, SEN39	6028842	8.2-2	17
Cable assembly, Basket Queue module sensor, SEN40	6028843	8.2-2	8
Cable assembly, Basket Queue module sensors	6028840	8.2-2	14
Cable assembly, emergency stop switch, SEN13-	6028836		
Cable assembly, flat flexible	6028488	8.2-8	4
Cable assembly, main cover open sensor, SEN53	6028834		
Cable assembly, power on/off switch	6028837		
Cable assembly, pressure and vacuum enable solenoids	6028913	8.2-9	28
Cable assembly, PS Mon/Distribution	6028765	8.2-9	25
Cable assembly, PS Mon/Printer power	6028755	8.2-9	27
Cable assembly, ribbon/flat, Basket Transport Interface card, 34 position, 68.6 cm (27 in.) L	6028779	8.2-8	8
Cable assembly, ribbon/flat, Dispense 1 Manifold card, 16 position, 76 cm (30 in.) L	6028777	8.2-8	16
Cable assembly, ribbon/flat, Dispense 2 Manifold card, 16 position, 76 cm (30 in.) L	6028856	8.2-8	17
Cable assembly, ribbon/flat, Dryer Interface card, 40 position, 76 cm (30 in.) L	6028776	8.2-8	7
Cable assembly, ribbon/flat, fluid detector data, 20 position, 17.8 cm (7 in.) L	6028778	8.2-8	2
Cable assembly, ribbon/flat, Main Fluidics Interface card, 16 position, 64.8 cm (25.5 in.) L	6028772	8.2-8	10
Cable assembly, ribbon/flat, printer data, 9 position, 61 cm (24 in.) L	6028771	8.2-8	11
Cable assembly, ribbon/flat, PS Mon data, 26 position, 38 cm (15 in.) L	6028775	8.2-8 8.2-9	12 26
Cable assembly, ribbon/flat, Slide Ejector Interface card, 26 position, 94 cm (37 in.) L	6028774	8.2-8	9
Cable assembly, ribbon/flat, Smear/Transport Interface card, 34 position, 63.5 cm (25 in.) L	6028770	8.2-8	1
Cable assembly, sensor 26	6028790	8.2-3	5
Cable assembly, sensor 27	6028832	8.2-3	2
Cable assembly, sensor, 25.4 cm (10.0 in.)	6028748	8.2-13 8.2-14	6 1
Cable assembly, sensor, 38 cm (15.0 in.)	6028749	8.2-3 8.2-4 8.2-11 8.2-12	1 1 4 14
Cable assembly, sensor, 53 cm (21.0 in.)	6028747	8.2-3 8.2-12	10, 20 9
Cable assembly, smear truck sensors, SEN18 and SEN19	6028907	8.2-15	3

Table 8.1-3 Master Parts List, C *(Continued)*

Description	Part Number	Figure	Item
Cable assembly, vacuum drain, SOL63	6028763		
Cable assembly, vacuum waste	6028753		
Cable, harness, Pneumatic Monitor cards, S/A	6805671	8.2-9	2
Cable, main power	6011023		
Cable, SOL120 to SlideMaker Interface card	6806194	8.2-10	9
Cassette, slide, molded	6806470		
Chamber, foam trap, S/A	6859138	8.2-7	11
Chamber, isolator, S/A	6858601	8.2-7	10
Chamber, plastic	6854732	8.2-8	18
Chamber, rinse housing vacuum, S/A;	6854848	8.2-7	9
Chamber, sheath tank, S/A	6805574	8.2-7	8
Chamber, vacuum/waste, S/A	6232825	8.2-8	23
Choke, pneumatic, orange, 0.006 orifice, 0.062 i.d. barbed ends	6232158	8.2-19	5
Consumable, LOCTITE™ adhesive/sealant	1601065		
Cover, basket queue door, LH SlideMaker	6807062	8.2-18	4
Cover, basket, S/A, for a GEN•S SM SlideMaker with a SlideStainer	6806847	8.2-17	3
Cover, basket, S/A, for a GEN•S SM SlideMaker without a SlideStainer	6806043	8.2-17	3
Cover, cassette access door, LH SlideMaker	6807061	8.2-18	2
Cover, Main Fluidics module	1023913		
Cover, main, LH SlideMaker	6807058	8.2-18	3
Cover, right side, service access, LH SlideMaker	6807272	8.2-18	8
Cover, SlideStainer interface, GEN•S SM SlideMaker	6805776	8.2-17	4
Cover, SlideStainer interface, LH SlideMaker	6807267	8.2-18	5
Cover, splash shield, Dispense module	6806855		
Cover, splash shield, Sample Access and Reservoir module	6806874		
Cover, splash shield, solenoid 120, CP	1025048		
Cover, top panel, LH SlideMaker	6807063	8.2-18	1
Cover, top rear panel, electronics, GEN•S SM SlideMaker	6805795	8.2-17	1
Cover, unicover, molded, latch sleeve, CP	1023879		
Cover, unicover, molded, latch, CP	1023878		
Cover, unicover, molded, S/A, GEN•S SM SlideMaker (main)	6806071	8.2-17	2
Custom Part, alignment pin, front cover, CP	1021433		
Custom Part, arm, cassette lockdown, left	6806305	8.2-3	19
Custom Part, arm, cassette lockdown, right	6806217	8.2-3	24
Custom Part, arm, slide retaining (gripper), CP	1024016	8.2-11	1

Table 8.1-3 Master Parts List, C *(Continued)*

Description	Part Number	Figure	Item
Custom Part, finger (hammer), slide accessible (part of X-register arm)	1024574	8.2-3	9
Cylinder, air, 1.5 stroke, 0.5 bore, double acting, aluminum	6232755	8.2-14	5
Cylinder, air, 1.63 stroke, 5/8 bore	6232889	8.2-2 8.2-4	2 2
Cylinder, air, 2.00 stroke, 0.50 bore, double acting, guided	6232833	8.2-12	6
Cylinder, air, 4.5 stroke, 3/8 bore, double acting, 125 psi max	6232747	8.2-13	5
Cylinder, air, double acting, 1 3/4 stroke, 1 1/16 stroke	6232901	8.2-3	4
Cylinder, air, double acting, 1/2 stroke, 1/2 bore	6232896	8.2-3	11
Cylinder, air, double acting, 1/2 stroke, 5/8 bore	6232900	8.2-3	3
Cylinder, air, single acting, spring return, 0.156 bore, 0.25 stroke	6232937	8.2-3	21
Cylinder, air, X-registration, S/A	6806358	8.2-3	22
Cylinder, lift, truck, CP	1024369	8.2-15	4
Cylinder, slide retaining, CP	1023783	8.2-11	3

Table 8.1-4 Master Parts List, D through F

Description	Part Number	Figure	Item
Door, left side cover, LH SlideMaker	6807059	8.2-18	6
Door, left side panel, S/A, GEN•S SM SlideMaker	6805796	8.2-17	5
Door, right side, rear cover, LH SlideMaker	6807060	8.2-18	7
Door, right side panel, mount, S/A, GEN•S SM SlideMaker	6805804		
Door, right side panel, S/A, GEN•S SM SlideMaker	6805797	8.2-17	6
Fan, 24 Vdc, S/A	6805679	8.2-8	6
Fan/blower, cfm, 24 Vdc	6028741	8.2-6	6
Filter, air	6232865	8.2-12	20
Filter, fan air	2603047		
Filter, line, 6 A, 220 V/50 Hz, 2 µA leakage	2707013	8.2-9	21
Filter, line, 6 A, 250 Vac/400 Hz, 190 µA max	2707014	8.2-9	19
Fitting, choke, pneumatic, black, 0.010 orifice, 0.063 i.d. barb to 10-32 thd, brass	6232695	8.2-2	1
Fitting, choke, pneumatic, brown, 0.006 orifice, 0.063 i.d.barb to 10-32 thd, brass	6232697	8.2-3 8.2-4 8.2-19	13 3 4
Fitting, choke, pneumatic, red, 0.008 orifice, 0.063 i.d.barb to 10-32 thd, brass	6232696	8.2-3	15
Fitting, choke, pneumatic, yellow, 0.004 orifice, 0.063 i.d.barb to 10-32 thd, brass	6232698	8.2-3	14
Fitting, elbow, miniature, adjustable, 2 mm (5/64) i.d. hose barb to 10-32 thd, brass	6232829	8.2-5 8.2-10 8.2-19	6 8 8
Fitting, feed-thru, small i.d. tubing	6806993	8.2-5 8.2-10	9 12
Fitting, internal to 0.094 hose	6232503		
Fitting, isolator, 10-32, CP	1016486	8.2-7 8.2-12 8.2-19	17 28 10
Fitting, Luer, 0.094 i.d, male	6232435	8.2-12	4
Fitting, Luer, external to 0.094 i.d., hose barb, plastic	6232436	8.2-12	3
Fitting, Luer, female, 0.093 hose barb	6232852	8.2-12	15
Fitting, Luer, internal to 0.063 hose barb	6232827	8.2-12	16
Fitting, Luer, locknut,1/4-28, bulkhead to Luer, white nylon	6232382	8.2-5 8.2-10 8.2-12 8.2-20	14 5 16 10
Fitting, Luer, male, lock ring, black nylon	6232666	8.2-9	12
Fitting, Luer, male, lock ring, blue nylon	6232663	8.2-9	10
Fitting, Luer, male, lock ring, green nylon	6232664	8.2-9 8.2-12	4 11
Fitting, Luer, male, lock ring, red nylon	6232665	8.2-9	6

Table 8.1-4 Master Parts List, D through F *(Continued)*

Description	Part Number	Figure	Item
Fitting, Luer, male, lock ring, white nylon (use with PN 6232436 and PN 6232435)	6232434	8.2-12	3
Fitting, Luer, male, lock ring, yellow nylon	6232662	8.2-9 8.2-12	8 17
Fitting, Luer, male, to 0.094 i.d. hose barb, polypropylene	6232660	8.2-9 8.2-12	3 11, 17
Fitting, quick disconnect, body, female, 10-tube	6232855		
Fitting, quick disconnect, body, male, 10-tube	6232853		
Fitting, quick disconnect, elbow insert, 1/4 hose barb	6232882		
Fitting, quick disconnect, elbow insert, 1/8 hose barb	6232883		
Fitting, quick disconnect, flex arms/joint, socket, 0.25 ball	2523743	8.2-5 8.2-10	12 1
Fitting, quick disconnect, internal connector, panel, 0.125 hose barb	6232644	8.2-9	16
Fitting, T, 0.0114 i.d., white	6216354		
Fitting, T, clear	6805067	8.2-19	3
Fitting, T, 0.094 i.d. tubing, polypropylene	6232051	8.2-19	2
Fitting, union, 0.062 i.d. to 0.062 i.d., bulkhead	1005697	8.2-12 8.2-19	27 11
Fitting, union, 0.062 i.d. to 0.082 i.d., bulkhead	1018021	8.2-7 8.2-10	16 11
Fitting, union, 0.062 i.d. to 10-32 thd	6232038	8.2-7	1
Fitting, union, 0.093 i.d. to 0.093 i.d., bulkhead	1005699	8.2-7 8.2-19	14 9
Fitting, union, clear, for 0.03 tubing	6805272	8.2-19	1
Fitting, union, plastic, 0.062 i.d. (reducer)	6232352	8.2-19	6
Fitting, Y, 0.085 i.d.	1018245	8.2-19	7
Fluid detector, S/A	6805569	8.2-5 8.2-10	13 3
Frame, S/A	6805728		
Fuse holder	9921373	8.2-9	20
Fuse, 6.0 A, 250 V, 0.25 x 1.25, glass, sloblo	5120175	8.2-9	22

Table 8.1-5 Master Parts List, G through L

Description	Part Number	Figure	Item
Gear, spur, 48 pitch, 120 teeth	2527729	8.2-12	12
Hardware, bracket, door holder (right door hinge), CP	1023626		
Hardware, clip, 5-way solenoid valve, CP	1021414	8.2-2 8.2-4 8.2-12 8.2-13	12 6 10 1
Hardware, coupling, flexible, 0.197 i.d. x 0.500 o.d., aluminum	2527763	8.2-2 8.2-3	7 16
Hardware, hinge, display panel, CP	6805857		
Hardware, hinge, hidden, zinc plate	2523647		
Hardware, latch, concealed, 3 lb pull up, 1.9 x 1.3 in. ABS, black	2852019	8.2-9	14
Hardware, mount, fluid detector, CP	1023417	8.2-5 8.2-10	10 2
Hardware, mount, pinch valve, CP	1017501	8.2-5 8.2-7 8.2-20	2 6 3
Hardware, plate, catch mount, S/A	6805820		
Hardware, plate, catch mount, S/A	6805821		
Hardware, plate, nut, side panel, S/A	6805768		
Hardware, plate, pusher (slide ejector)	7000658	8.2-3	23
Hardware, retaining ring	2837037	8.2-6	11
Hardware, support, dispense backwash trough, S/A	6805062	8.2-14	2
Heat source assembly	6706225	8.2-6	7
Housing, S/A	6805776		
Leveling foot	3908015		
Lever and spring assembly (for SEN46)	6807184	8.2-6	5
Lever, tilt (on smear truck)	6806635	8.2-15	7

Table 8.1-6 Master Parts List, M

Description	Part Number	Figure	Item
Manifold, 5 psi, CP	1007924	8.2-8	19
Manifold, CP, MF7	1006763	8.2-8	20
Manifold, solenoid valve, 4-position	6232850	8.2-10	6
Manifold, solenoid valves, pneumatic, 10-position, 24 Vdc	6232748	8.2-5 8.2-7	17 15
Manifold, w/ four solenoid valves	6232836	8.2-3	12
Module, Cassette Input Queue and Slide Ejector	7000713	8.2-3	
Module, Keypad and Display	4837349		
Module, Slide Elevator	7000714	8.2-11	
Module, Upper Cassette Transfer Mechanism, S/A	6806011	8.2-13	
Motor, ejector pusher	6806347	8.2-3	17
Motor, dc, brushless, 24 Vdc, 10 K rpm, 3.86 oz-in.	3505050	8.2-12	8
Motor, linear, digital, 12 Vdc	3533110	8.2-11	6
Motor, stepper, 1.8 degree, 6 Vdc, 3000 rpm, 36.1 oz-in.	3505055	8.2-12	24
Motor, stepper, 9.6 Vdc, 0.1 degree/step, 111 oz-in.	3505056	8.2-2	3
Motor, stepper, w/ offset 300:1	3505053	8.2-6	9

Table 8.1-7 Master Parts List, N through P

Description	Part Number	Figure	Item
Needle, low pierce cartridge	6806229		
O-ring, 0.187 i.d. x 0.050 w	2523062	8.2-4 8.2-7	4 2
O-ring, shuttle	2527822	8.2-12	22
O-ring, smear truck	2512026		
PCB, Basket Corner Sensor	6706563	8.2-2	6
PCB, Basket Index	6706669	8.2-2	4
PCB, Basket Transport Interface	6706417	8.2-2	16
PCB, Belt Profile Sensor	6706667	8.2-2	15
PCB, Cassette Empty Sensor (SEN28)	6706415	8.2-3	6
PCB, Dryer Interface	6706403	8.2-6	8
PCB, Main Distribution	6706742	8.2-8	13
PCB, Pneumatic Monitor, 17.5 in. Hg	6706514	8.2-9	11
PCB, Pneumatic Monitor, 30 PSI	6706511	8.2-9	5
PCB, Pneumatic Monitor, 6 PSI	6706512	8.2-9	7
PCB, Pneumatic Monitor, 6.5 in. Hg	6706513	8.2-9	13
PCB, Pneumatic Monitor, Vacuum	6706515	8.2-9	9
PCB, Power Supply Monitor	6706561	8.2-9	1
PCB, Slide Accessible (contains SEN17 and SEN25)	6706915	8.2-3	10
PCB, Slide Detector (Dryer Exit Sensor card)	6706665	8.2-6	3
PCB, Slide Ejector Interface	6706743	8.2-3	18
PCB, SlideMaker Drivers 1, daughter card for System Control card (replaces U25, U26, U35, and U36)	6707081	8.2-8	14
PCB, SlideMaker Drivers 2, daughter card for System Control card (replaces U27, U28, U37, and U38)	6707082	8.2-8	15
PCB, Smear/Transport Interface	6706744	8.2-13	4
PCB, System Control	6706687	8.2-8	5
PCB, Temperature Sensor	6706083	8.2-6	2
Platen, S/A	6806156	8.2-11	11
Power supply	4004091	8.2-9	18
Printer assembly	7000707	8.2-16	1
Printhead, thermal transfer	2016912	8.2-16	2
Probe, dispense	1022962	8.2-14	4
Pulley, wheel, right, CP	1023941	8.2-6	10
Pump, pinch, S/A	6805571	8.2-5	7

Table 8.1-8 Master Parts List, R and S

Description	Part Number	Figure	Item
Regulator and flow meter, pressure, 1-10 psi, miniature	6232847	8.2-8	22
Regulator and flow meter, vacuum, 7 in. Hg	6232628	8.2-7	13
Regulator, vacuum, 0-25 in. Hg, S/A	6232840	8.2-7	12
Reservoir rod, S/A	6806096	8.2-10	15
Rinse block, dispense, self aligning, S/A	6805063	8.2-14	3
Screw, machine, metric, M3 x 5 mm, hsc-head, hex	2852361	8.2-3	25
Screw, setscrew, 4-40 x 0.50, self-locking	2852343	8.2-11	10
Screw, setscrew, 6-32 x 0.125	2807004	8.2-12	13
Screw, setscrew, 4-40 x 0.38, self-locking (lift-up setscrew)	2852395	8.2-15	6
Screw, shoulder, 4-40 x 0.28, 0.125 l	2851227	8.2-11	8
Screw, shoulder, 4-40, 0.125 diameter (tilt-lever screw)	1024366	8.2-15	8
Screw, thumbscrew, 6-32, knurled shoulder (for securing splash shields)	2815022		
Sensor, encoder, optical, three-channel	4837095	8.2-14	2
Shuttle, S/A	1024338	8.2-12	23
Software, Printer EPROM, version 2.8	2016819		
Spring, compression, 0.300 o.d. x 2.50 l x 0.22 w (for smear truck)	2527784	8.2-15	2
Spring, compression LH SlideMaker main cover	2515038		
Spring, extension	2527787	8.2-11	9
Spring, gas, LH SlideMaker main cover	2527894		
Spring, torsion spring, slide, CP	1024308	8.2-11	2
Suppressor, transient voltage, assembly 2	6706401	8.2-9	24
Switch and lever assembly	6805693	8.2-6	5
Switch, accessories, magnet actuator, use with PN 5116004	5111192		
Switch, light modulation, CP	1024087	8.2-11	7
Switch, push button, 0.5 A at 250 Vac, green LED (1 A at 30 Vdc)	5120239		
Switch, push button, 0.5 A at 250 Vac, red LED (1 A at 30 Vdc)	5104100		
Switch, rocker, dpst, 16 A at 250 Vac, lighted, green neon	5105001	8.2-9	23
Switch, vacuum/pressure, high vacuum	5115016	8.2-12	2

Table 8.1-9 Master Parts List, T and U

Description	Part Number	Figure	Item
Tray, vacuum formed, left, CP	1023608		
Tray, vacuum formed, right, CP	1023609		
Trim, decorative, PVC, black	3202044		
Truck, smear, assembly	7000712	8.2-15	
Truck, smear, with ball bearings, S/A	1024596	8.2-15	9
Tubing, collar, silicone	1023662		
Tubing, flex (coiled), truck, CP	1024310	8.2-12 8.2-15	7 1
Tubing, polyurethane, 0.062 i.d.	3213063		
Tubing, polyurethane, 0.082 i.d.	3202037		
Tubing, polyurethane, 0.082 i.d., blue stripe	3202209		
Tubing, polyurethane, 0.082 i.d., clear	3202036		
Tubing, polyurethane, 0.082 i.d., green stripe	3202208		
Tubing, polyurethane, 0.082 i.d., green/black stripe	3202217		
Tubing, polyurethane, 0.082 i.d., grey stripe	3202211		
Tubing, polyurethane, 0.082 i.d., grey/black stripe	3202244		
Tubing, polyurethane, 0.082 i.d., purple stripe	3202210		
Tubing, polyurethane, 0.082 i.d., red stripe	3202205		
Tubing, polyurethane, 0.082 i.d., red/black stripe	3202214		
Tubing, polyurethane, 0.082 i.d., yellow stripe	3202207		
Tubing, polyurethane, 0.082 i.d., yellow/black stripe	3202216		
Tubing, polyurethane, 0.113 i.d.	3202038		
Tubing, restrictor line, vacuum, 15"	6807015		
Tubing, restrictor line, vacuum, 4"	6806997		
Tubing, ribbon (double coiled), CP	1024058	8.2-12 8.2-15	7 5
Tubing, ribbon, six-tubed, 0.113 i.d./0.237 o.d., striped, polyurethane	1023716		
Tubing, shielded cleaning agent	6806197		
Tubing, shielded diluent	6806195		
Tubing, shielded waste	6806193		
Tubing, silicone, 0.062, black stripe, pull apart	3213136		
Tubing, silicone, brown stripe	3213163		
Tubing, silicone, red stripe, pull apart	3213139		
Tubing, silicone, yellow stripe	3213176		
Tubing, sleeve, for mini pinch valve	1024575	8.2-5 8.2-20	16 8

Table 8.1-9 Master Parts List, T and U *(Continued)*

Description	Part Number	Figure	Item
Tubing, special, 50 durometer hardness	3230059		
Tubing, special, 8 ribbon	3230068		
Tubing, special, coiled, 0.38 i.d. x 1.25 cm (0.49 in.) L, CP	1023707	8.2-12	23

Table 8.1-10 Master Parts List, V through Z

Description	Part Number	Figure	Item
Valve, check	6232080		
Valve, pinch, deactivator clip, red, holds pinch valve open	1008315	8.2-20	1
Valve, pinch valve, single tube, black, S/A	6857096	8.2-5 8.2-10 8.2-20	11 4 7
Valve, pinch valve, single tube, grey, S/A	6806850	8.2-5 8.2-10 8.2-20	15 14 9
Valve, pinch, standard, pull apart, assembly	6855763	8.2-5 8.2-7 8.2-12 8.2-20	1 7 26 2
Valve, solenoid, hydraulic, 3-way NC, ppt, 30 psi	6232856	8.2-5 8.2-10	18 13
Valve, solenoid, pneumatic, 3-way NC, 0-50 psi	6214112	8.2-10	10
Valve, solenoid, pneumatic, 3-way NC, 0-57 psi	6214109	8.2-11	5
Valve, solenoid, pneumatic, 5-way NO, spool, 100 psi, 10 cfm, 24 Vdc	6232958	8.2-2 8.2-3 8.2-4 8.2-12 8.2-13	11 16 5 9 3
Valve, solenoid, pressure enable, 3-way, NC, 24 Vdc	6232844	8.2-9	15
Valve, solenoid, three on a partitioned manifold, S/A	6232837	8.2-12	1
Valve, solenoid, vacuum enable, 3-way, NC, 24 Vdc	6232845	8.2-9	17
Valve, solenoid, waste	6232839	8.2-8	21
Washer, cylinder, 0.500 i.d. x 0.562 o.d. x 0.062 thk	6216012	8.2-5 8.2-7 8.2-20	4 4 5
Washer, I-tooth, #47, 0.47 i.d. x 0.60 o.d. x 0.020 thk	2826030	8.2-5 8.2-7 8.2-20	3 5 4
Z-axis register S/A	7000680	8.2-3	7

8.2 ILLUSTRATED PARTS

On the illustrations in this section, a number is used to identify the part in the associated parts list, a letter to indicate detailed illustrations are available for the component or assembly.

Figure 8.2-1 Main SlideMaker Modules Illustrated

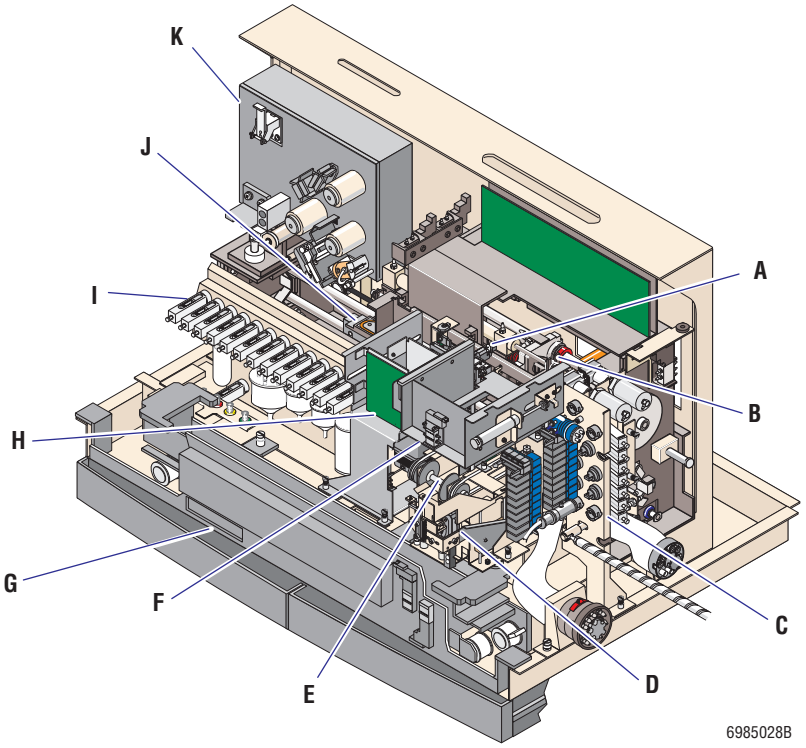

Figure References

A Figure 8.2-3, Slide Ejector module

B Figure 8.2-12, Smear module

C Figure 8.2-5, Dispense module

D Figure 8.2-11, Slide Elevator module

E Figure 8.2-6, Dryer module

F Figure 8.2-4, Cassette Output Queue module

G Figure 8.2-2, Basket Queue module

H Figure 8.2-3, Cassette Input Queue module

I Figure 8.2-7, Main Fluidics module

J Figure 8.2-12, Slide Transport module

K Figure 8.2-16, Label Printer module

Table 8.2-1 SlideMaker Modules and Components Illustrated but Not Referenced in Figure 8.2-1

Figure Title	Figure Number
Rear Compartment Components	Figure 8.2-8
Rear Door Components	Figure 8.2-9
Sample Access and Reservoirs Module Components	Figure 8.2-10
Covers and Doors on the GEN•S SM SlideMaker	Figure 8.2-17
Covers and Doors on the LH SlideMaker	Figure 8.2-18
Chokes and Fittings	Figure 8.2-19
Common Valves	Figure 8.2-20

Figure 8.2-2 Basket Queue Module (See Table 8.2-2)

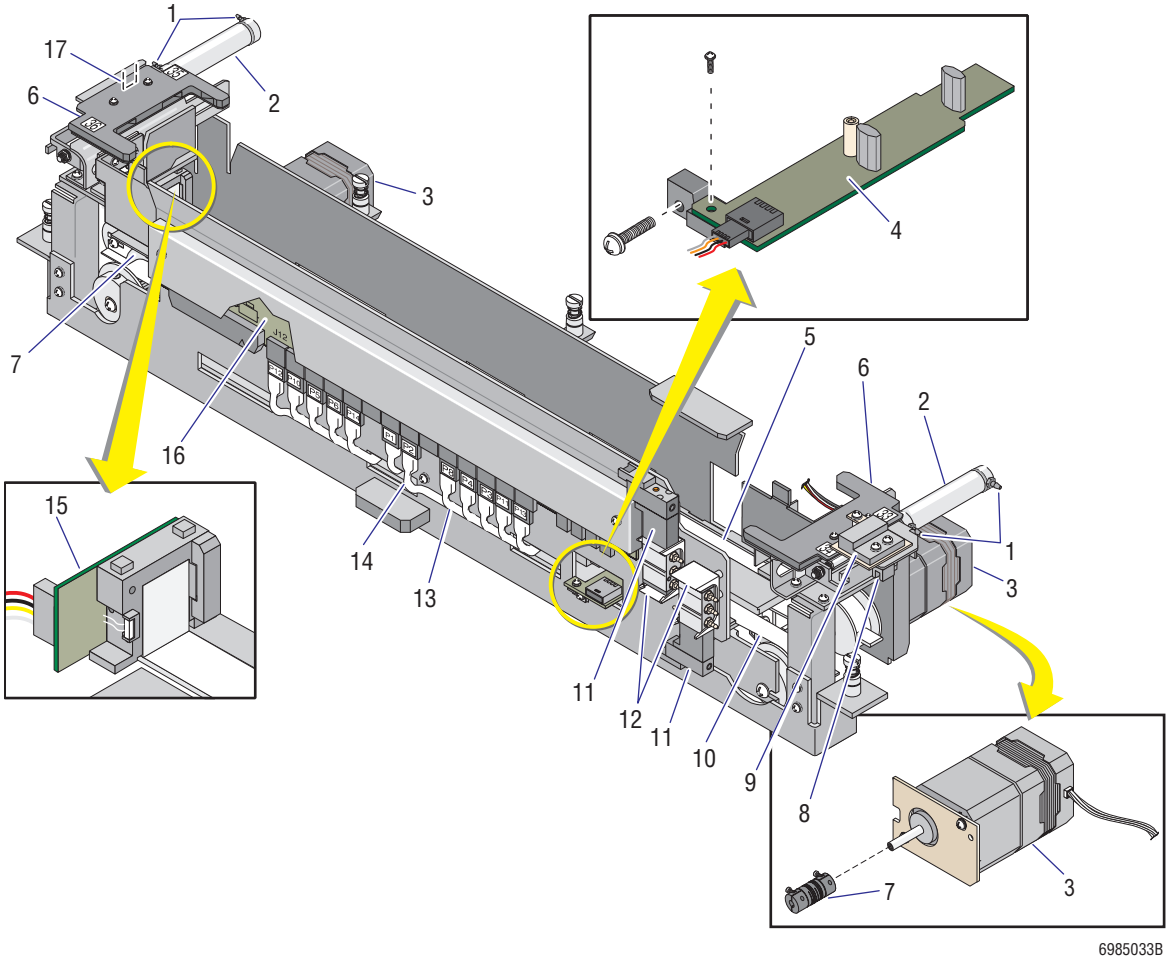

Table 8.2-2 Basket Queue Module (See Figure 8.2-2)

Item	Part Number	Description
1	6232695	Fitting, choke, pneumatic, black, 0.010 orifice, 0.063 i.d. barb to 10-32 thd, brass
2	6232889	Cylinder, air, 1.63 stroke, 5/8 bore
3	3505056	Motor, stepper, 9.6 Vdc, 0.1 degree/step, 111 oz-in.
4	6706669	PCB, Basket Index
5	2527696	Belt, drive inner basket transport
6	6706563	PCB, Basket Corner Sensor
7	2527763	Hardware, coupling, flexible, 0.197 i.d. x 0.500 o.d., aluminum
8	6028843	Cable assembly, Basket Queue module sensor, SEN40
9	6028835	Cable assembly, basket cover interlock sensor, SEN54
10	2527695	Belt, outer drive basket transport
11	6232958	Valve, solenoid, pneumatic, 5-way NO, spool, 100 psi, 10 cfm, 24 Vdc
12	1021414	Hardware, clip, 5-way solenoid valve, CP
13	6028841	Cable assembly, Basket Queue module sensor, SEN37
14	6028840	Cable assembly, Basket Queue module sensors
15	6706667	PCB, Belt Profile Sensor
16	6706417	PCB, Basket Transport Interface
17	6028842	Cable assembly, Basket Queue module sensor, SEN39

Figure 8.2-3 Cassette Input Queue Module and Slide Ejector Module (See Table 8.2-3)

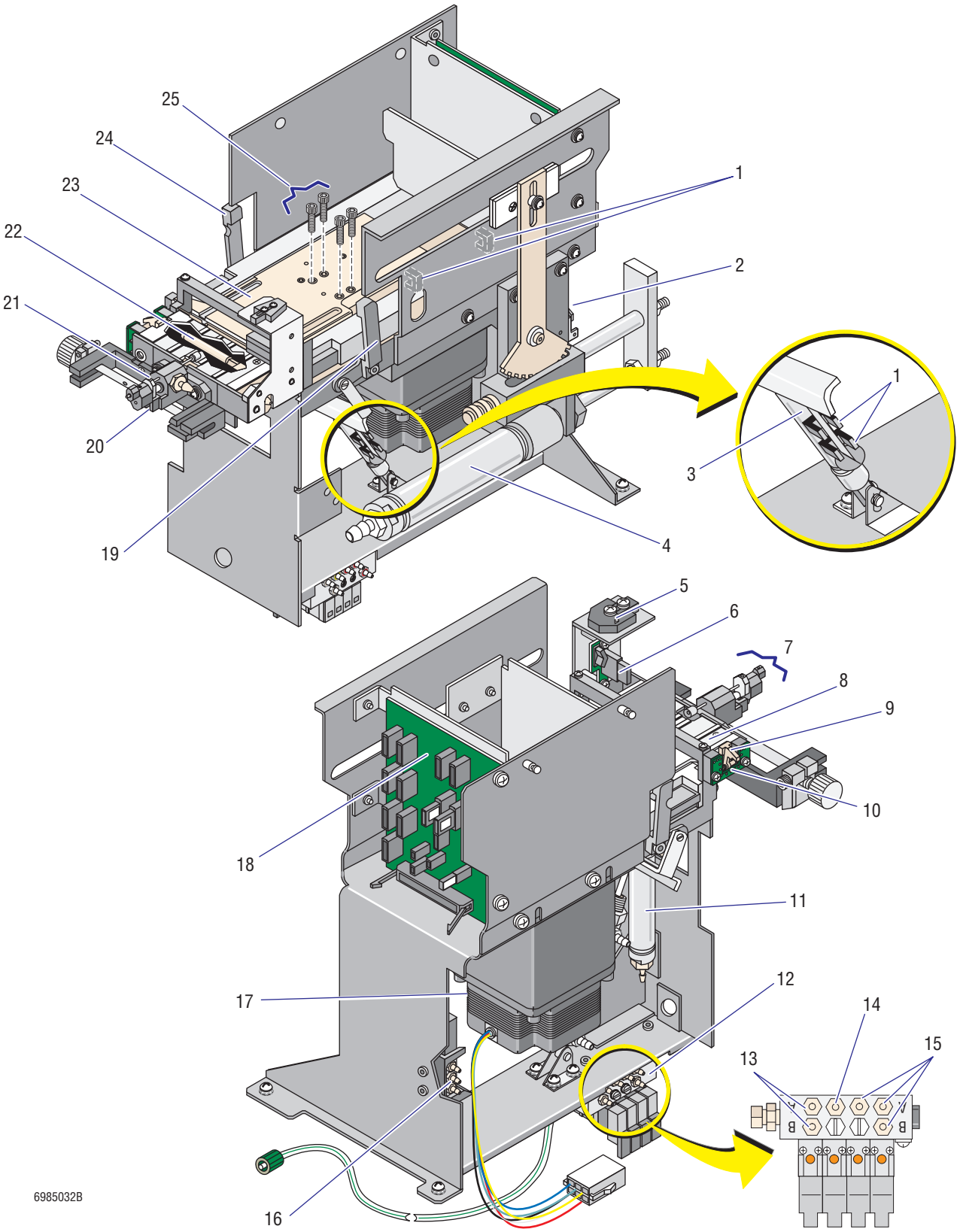

Table 8.2-3 Cassette Input Queue Module and Slide Ejector Module (See Figure 8.2-3)

Item	Part Number	Description
	7000713	Module, Cassette Input Queue and Slide Ejector
1	6028749	Cable assembly, sensor, 38 cm (15.0 in.)
2	6028832	Cable assembly, sensor 27
3	6232900	Cylinder, air, double acting, 1/2 stroke, 5/8 bore
4	6232901	Cylinder, air, double acting, 1 3/4 stroke, 1 1/16 stroke
5	6028790	Cable assembly, sensor 26
6	6706415	PCB, Cassette Empty Sensor (SEN28)
7	7000680	Z-axis register S/A
8	1024095	Bridge, slide pickup
9	1024574 2527850	Custom Part, finger (hammer), slide accessible (part of X-register arm) Bushing (two each)
10	6706915 6028747	PCB, Slide Accessible (contains SEN17 and SEN25) Cable assembly, sensor, 53 cm (21.0 in.)
11	6232896	Cylinder, air, double acting, 1/2 stroke, 1/2 bore
12	6232836	Manifold, w/ four solenoid valves
13	6232697	Fitting, choke, pneumatic, brown, 0.006 orifice, 0.063 i.d.barb to 10-32 thd, brass
14	6232698	Fitting, choke, pneumatic, yellow, 0.004 orifice, 0.063 i.d.barb to 10-32 thd, brass
15	6232696	Fitting, choke, pneumatic, red, 0.008 orifice, 0.063 i.d.barb to 10-32 thd, brass
16	6232958	Valve, solenoid, pneumatic, 5-way NO, spool, 100 psi, 10 cfm, 24 Vdc (SOL50)
17	6806347	Motor, ejector pusher
18	6706743	PCB, Slide Ejector Interface
19	6806305	Custom Part, arm, cassette lockdown, left
20	6028747	Cable assembly, sensor, 53 cm (21.0 in.)
21	6232937	Cylinder, air, single acting, spring return, 0.156 bore, 0.25 stroke
22	6806358	Cylinder, air, X-registration, S/A
23	7000658	Hardware, plate, pusher (slide ejector)
24	6806217	Custom Part, arm, cassette lockdown, right
25	2852361	Screw, machine, metric, M3 x 5 mm, hsc-head, hex

Figure 8.2-4 Cassette Output Queue Module 2 (See Table 8.2-4)

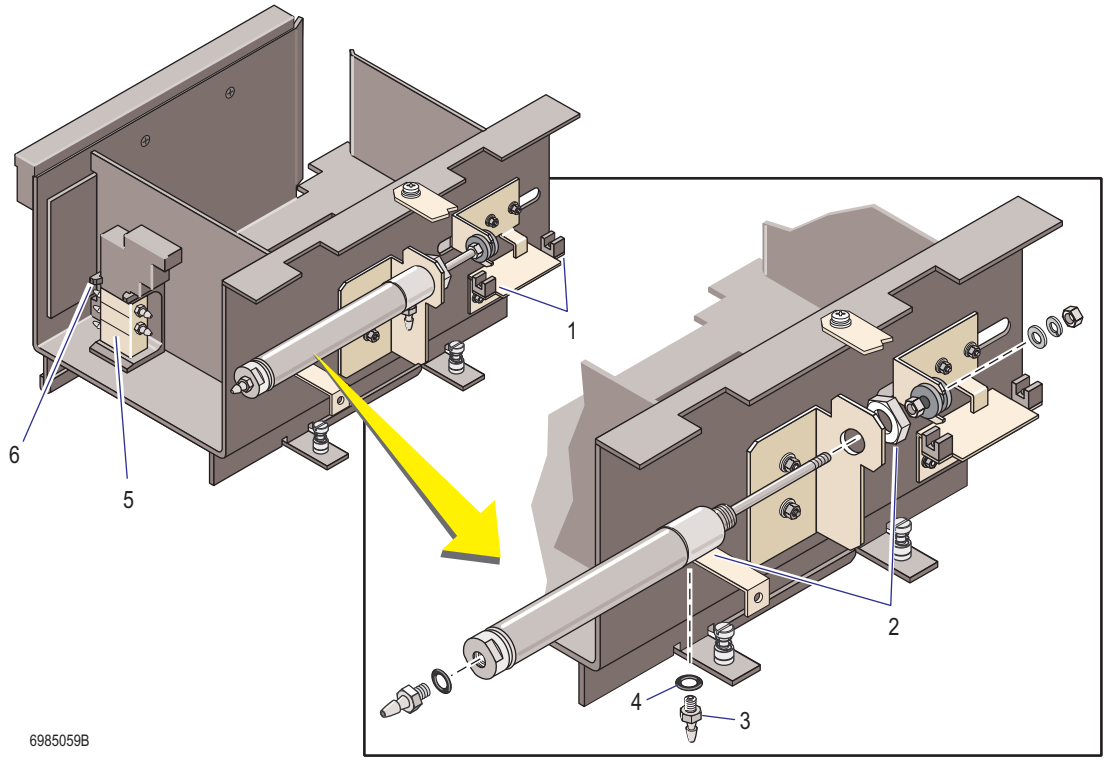

Table 8.2-4 Cassette Output Queue Module (See Figure 8.2-4)

Item	Part Number	Description
1	6028749	Cable assembly, sensor, 38 cm (15.0 in.)
2	6232889	Cylinder, air, 1.63 stroke, 5/8 bore
3	6232697	Fitting, choke, pneumatic, brown, 0.006 orifice, 0.063 i.d.barb to 10-32 thd, brass
4	2523062	O-ring, 0.187 i.d. x 0.050 w
5	6232958	Valve, solenoid, pneumatic,5-way NO, spool, 100 psi, 10 cfm, 24 Vdc
6	1021414	Hardware, clip, 5-way solenoid valve, CP

Figure 8.2-5 Dispense Module (See Table 8.2-5)

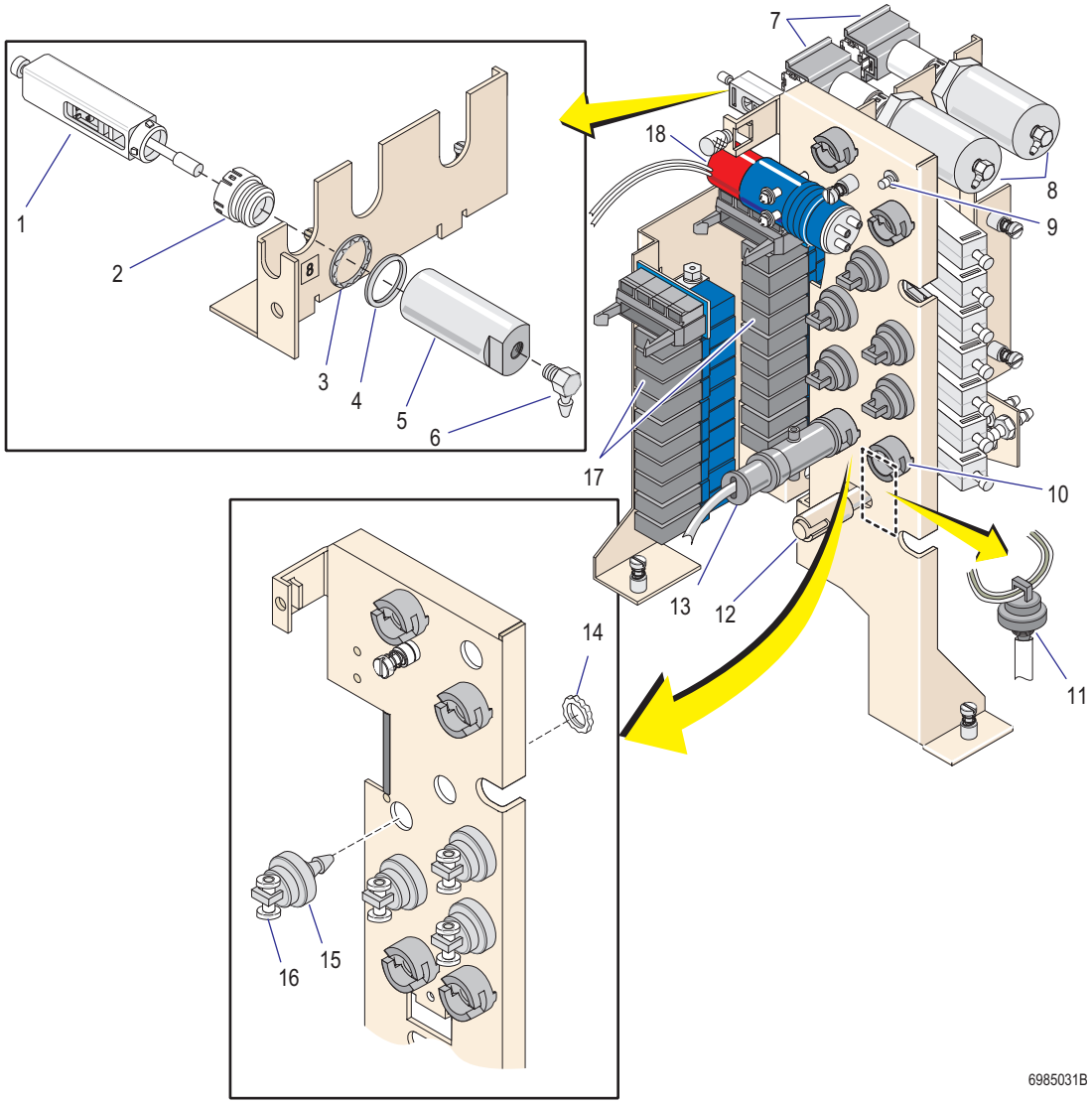

Table 8.2-5 Dispense Module (See Figure 8.2-5)

Item	Part Number	Description
Components Illustrated		
1	6855763	Valve, pinch, standard, pull apart, assy
2	1017501	Hardware, mount, pinch valve, CP
3	2826030	Washer, I-tooth, #47, 0.47 i.d. x 0.60 o.d. x 0.020 thk
4	6216012	Washer, cylinder, 0.500 i.d. x 0.562 o.d. x 0.062 thk
5	6211015	Actuator, valve, pilot, 7/16 bore, nickel plated
6	6232829	Fitting, elbow, miniature, adjustable, 2 mm (5/64) i.d. hose barb to 10-32 thd, brass
7	6805571	Pump, pinch, S/A
8	6232447	Actuator, valve, pilot piston, pneumatic, 11.6 lb, brass
9	6806993	Fitting, feed-thru, small i.d. tubing
10	1023417	Hardware, mount, fluid detector, CP
11	6857096	Valve, pinch valve, single tube, black, S/A
12	2523743	Fitting, quick disconnect, flex arms/joints, socket
13	6805569	Fluid detector, S/A
14	6232382	Fitting, Luer, locknut,1/4-28, bulkhead to Luer, white nylon
15	6806850	Valve, pinch, single tube, grey, S/A
16	1024575	Tubing, sleeve, for mini pinch valve, CP
17	6232748	Manifold, solenoid valves, pneumatic, 10 position, 24 Vdc
18	6232856	Valve, solenoid, hydraulic, 3-way NC, ppt, 30 psi
Components Not Illustrated		
N/A	1023662	Collar, silicone tubing
N/A	3230059	Tubing, special, 50 durometer hardness
N/A	6232158	Choke, pneumatic, orange (See Figure 8.2-19, item 5.)
N/A	6232352	Fitting, union, plastic, 0.062 i.d. (See Figure 8.2-19, item 6.)
N/A	6805067	Fitting, T, yellow (See Figure 8.2-19, item 3.)
N/A	6805272	Fitting, union, for 0.03, yellow I-beam tubing (See Figure 8.2-19, item 1.)

Figure 8.2-6 Dryer Module (See Table 8.2-6)

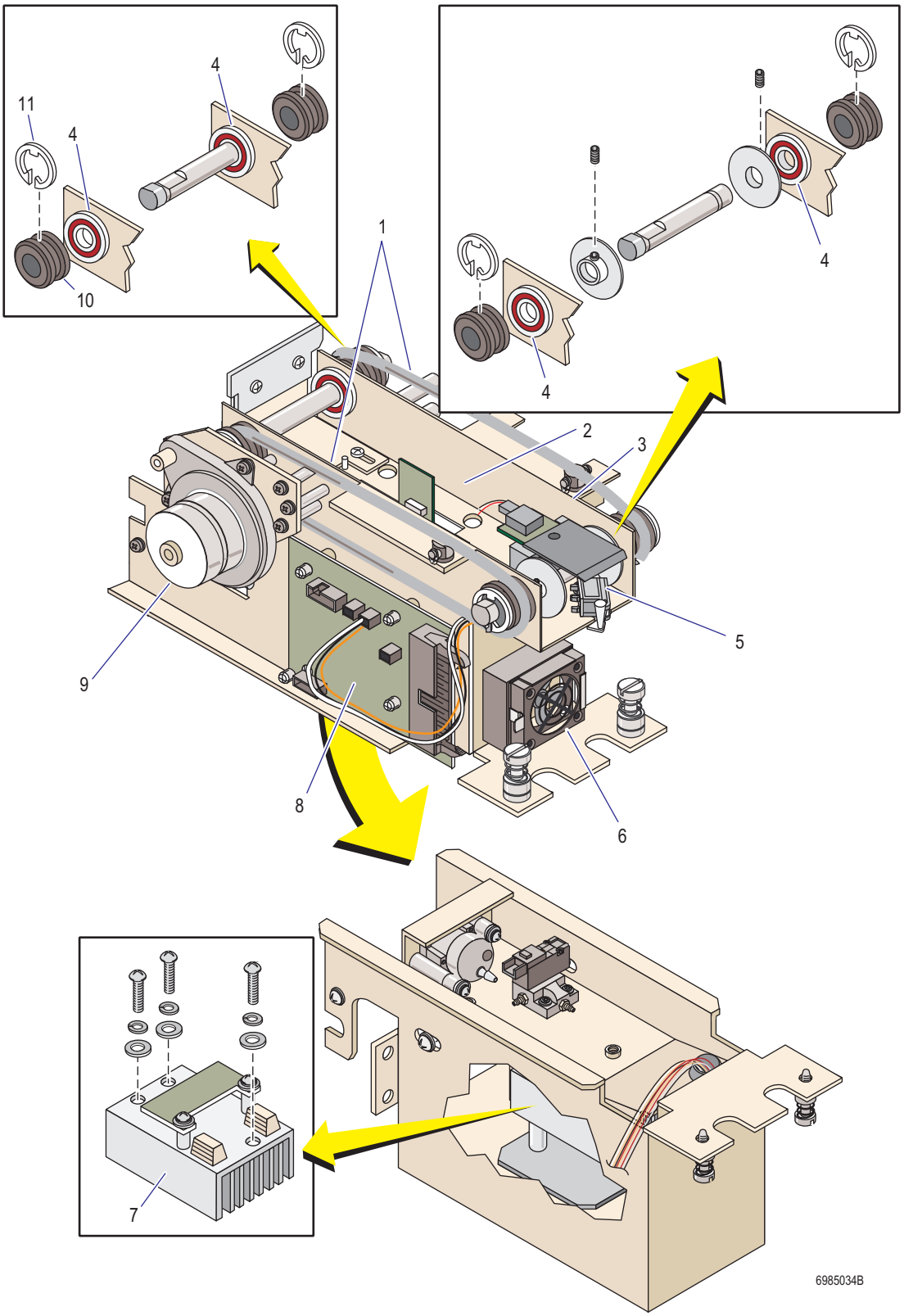

Table 8.2-6 Dryer Module (See Figure 8.2-6)

Item	Part Number	Description
1	1023108	Belt, conveyor, CP
2	6706083	PCB, Temperature Sensor
3	6706665	PCB, Slide Detector (Dryer Exit Sensor card)
4	2523625	Bearing, roller, assembly
5	6805693 6807184	Switch and lever assembly Lever and spring assembly
6	6028741	Fan/blower, cfm, 24 Vdc
7	6706225	Heat source assembly
8	6706403	PCB, Dryer Interface
9	3505053	Motor, stepper, w/ offset 300:1
10	1023941	Pulley, wheel, right, CP
11	2837037	Hardware, retaining ring

Figure 8.2-7 Main Fluidics (See Table 8.2-7)

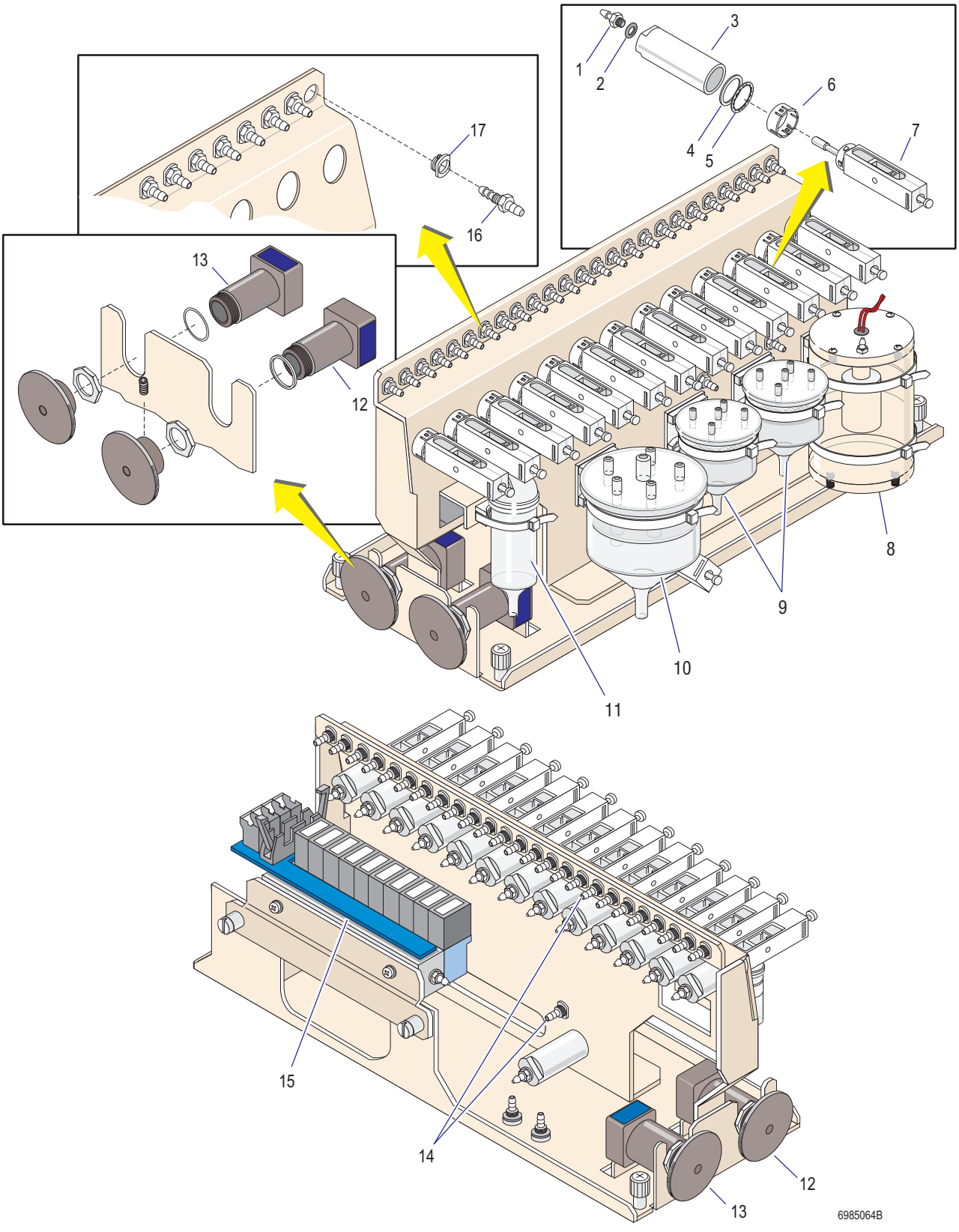

Table 8.2-7 Main Fluidics Module (See Figure 8.2-7)

Item	Part Number	Description
Components Illustrated		
1	6232038	Fitting, union, 0.062 i.d. to 10-32 thd
2	2523062	O-ring, 0.187 i.d. x 0.050 w
3	6211015	Actuator, valve, pilot, 7/16 bore, nickel plated
4	6216012	Washer, cylinder, 0.500 i.d. x 0.562 o.d. x 0.062 thk
5	2826030	Washer, I-tooth, #47, 0.47 i.d. x 0.60 o.d. x 0.020 thk
6	1017501	Hardware, mount, pinch valve, CP
7	6855763	Valve, pinch, standard, pull apart, assy
8	6805574	Chamber, sheath tank, S/A
9	6854848	Chamber, rinse housing vacuum, S/A
10	6858601	Chamber, isolator, S/A
11	6859138	Chamber, foam trap, S/A
12	6232840	Regulator, vacuum, 0-25 in. Hg, S/A
13	6232628	Regulator and flow meter, vacuum, 7 in. Hg
14	1005699	Fitting, union, 0.093 i.d. to 0.093 i.d., bulkhead
15	6232748	Manifold, solenoid valve, pneumatic, 10 position, 24 Vdc
16	1018021	Fitting, union, 0.062 i.d. to 0.082 i.d., bulkhead **Note:** All fittings in this row are this part number except the eighth fitting from the left, the one identified as PN 1005699.
17	1016486	Fitting, isolator, 10-32, CP
Components Not Illustrated		
N/A	1023913	Cover, Main Fluidics module
N/A	6232352	Fitting, union, plastic, 0.062 i.d. (See Figure 8.2-19, item 4.)
N/A	6807015	Tubing, restrictor line, vacuum, 15"
N/A	6806997	Tubing, restrictor line, vacuum, 4"

Figure 8.2-8 Rear Compartment (See Table 8.2-8)

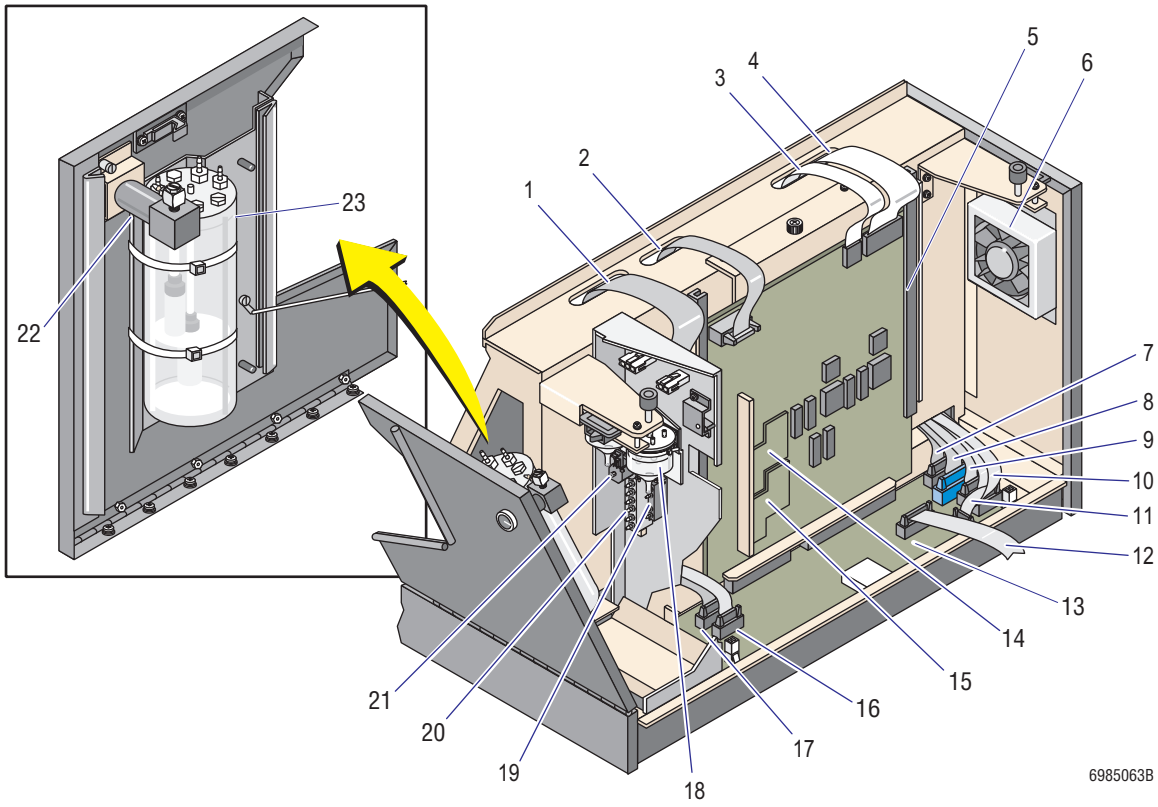

Table 8.2-8 Rear Compartment (See Figure 8.2-8)

Item	Part Number	Description
1	6028770	Cable assembly, ribbon/flat, Smear/Transport Interface card, 34 position, 63.5 cm (25 in.) L (P6)
2	6028778	Cable assembly, ribbon/flat, fluid detector data, 20 position, 17.8 cm (7 in.) L (P5)
3	6028862	Cable assembly, 6-position, 51 cm (20 in.) L
4	6028488	Cable assembly, flat flexible
5	6706687	PCB, System Control
6	6805679	Fan, 24 Vdc, S/A
7	6028776	Cable assembly, ribbon/flat, Dryer Interface card, 40 position, 76 cm (30 in.) L (P8)
8	6028779	Cable assembly, ribbon/flat, Basket Transport Interface card, 34 position, 68.6 cm (27 in.) L (P7)
9	6028774	Cable assembly, ribbon/flat, Slide Ejector Interface card, 26 position, 94 cm (37 in.) L (P9)
10	6028772	Cable assembly, ribbon/flat, Main Fluidics Interface card, 16 position, 64.8 cm (25.5 in.) L (P1 to P12)
11	6028771	Cable assembly, ribbon/flat, printer data, 9 position, 61 cm (24 in.) L (P3)
12	6028775	Cable assembly, ribbon/flat, PS Mon data, 26 position, 38 cm (15 in.) L (P5)
13	6706742	PCB, Main Distribution
14	6707081	PCB, SlideMaker Drivers 1, daughter card for System Control card (replaces U25, U26, U35, and U36)
15	6707082	PCB, SlideMaker Drivers 2, daughter card for System Control card (replaces U27, U28, U37, and U38)
16	6028777	Cable assembly, ribbon/flat, Dispense 1 Manifold card, 16 position, 76 cm (30 in.) L (P11)
17	6028856	Cable assembly, ribbon/flat, Dispense 2 Manifold card, 16 position, 76 cm (30 in.) L (P10)
18	6854732	Chamber, plastic
19	1007924	Manifold, 5 psi, CP
20	1006763	Manifold, CP, MF7
21	6232839	Valve, solenoid, waste
22	6232847	Regulator and flow meter, pressure, 1-10 psi, miniature
23	6232825	Chamber, vacuum/waste, S/A

Figure 8.2-9 Rear Door (See Table 8.2-9)

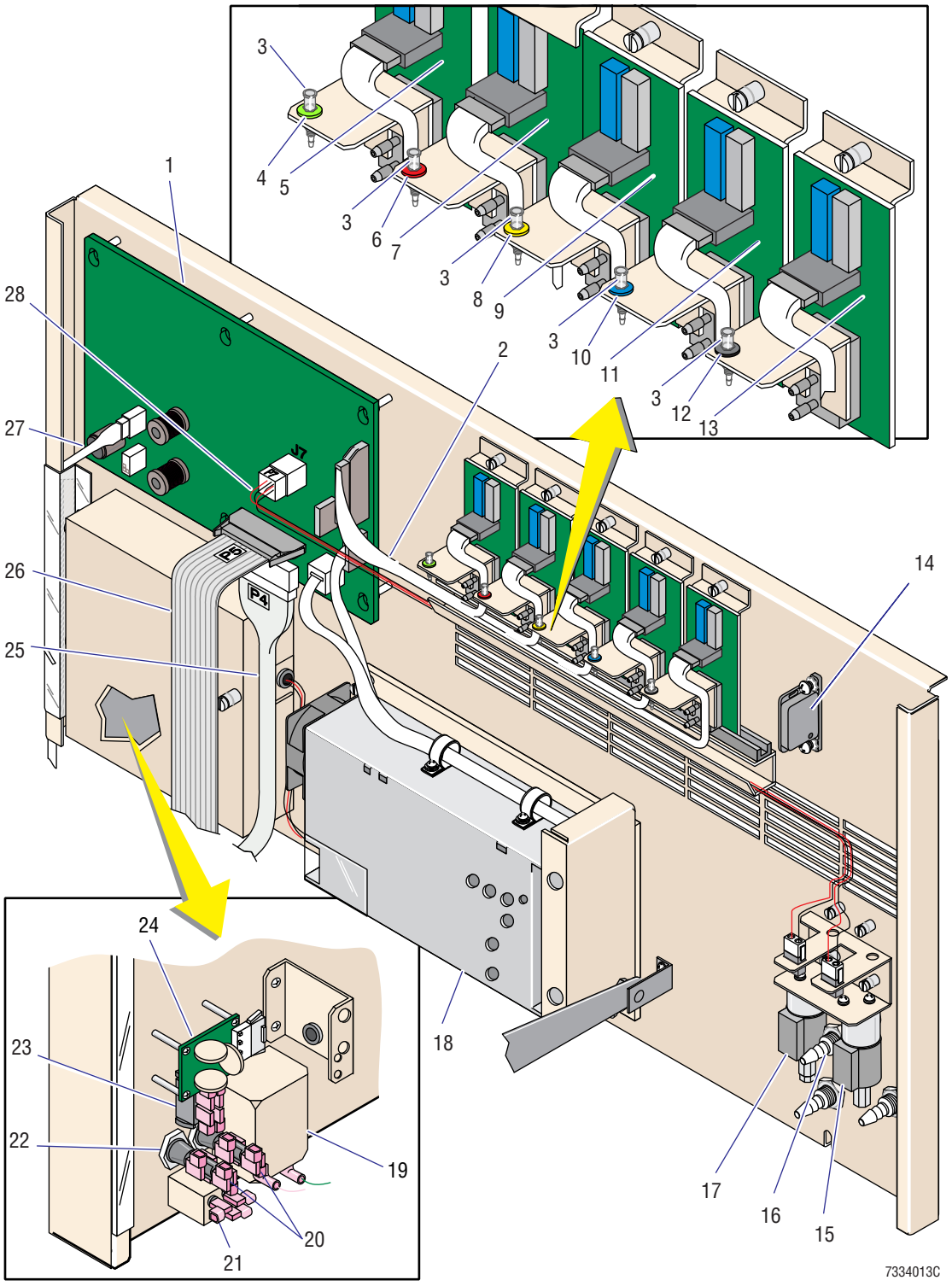

Table 8.2-9 Rear Door (See Figure 8.2-9)

Item	Part Number	Description
1	6706561	PCB, Power Supply Monitor
2	6805671	Cable, harness, Pneumatic Monitor cards, S/A
3	6232660	Fitting, Luer, male, to 0.094 i.d. hose barb, polypropylene
4	6232664	Fitting, Luer, male, lock ring, green nylon
5	6706511	PCB, Pneumatic Monitor, 30 PSI
6	6232665	Fitting, Luer, male, lock ring, red nylon
7	6706512	PCB, Pneumatic Monitor, 6 PSI
8	6232662	Fitting, Luer, male, lock ring, yellow nylon
9	6706515	PCB, Pneumatic Monitor, Vacuum
10	6232663	Fitting, Luer, male, lock ring, blue nylon
11	6706514	PCB, Pneumatic Monitor, 17.5 in. Hg
12	6232666	Fitting, Luer, male, lock ring, black nylon
13	6706513	PCB, Pneumatic Monitor, 6.5 in. Hg
14	2852019	Hardware, latch, concealed, 3 lb pull up, 1.9 x 1.3 in. ABS, black
15	6232844	Valve, solenoid, pressure enable, 3-way, NC, 24 Vdc
16	6232644	Fitting, quick disconnect, internal connector, panel, 0.125 hose barb
17	6232845	Valve, solenoid, vacuum enable, 3-way, NC, 24 Vdc
18	4004091	Power supply
19	2707014	Filter, line, 6 A, 250 Vac/400 Hz, 190 µA max
20	9921373	Fuse holder
21	2707013	Filter, line, 6 A, 220 V/50 Hz, 2 µA leakage
22	5120175	Fuse, 6.0 A, 250 V, 0.25 x 1.25, glass, sloblo
23	5105001	Switch, rocker, dpst, 16 A at 250 Vac, lighted, green neon
24	6706401	Suppressor, transient voltage, assembly 2
25	6028765	Cable assembly, PS Mon/Distribution
26	6028775	Cable assembly, ribbon/flat, PS Mon data, 26 position, 38 cm (15 in.) L
27	6028755	Cable assembly, PS Mon/Printer power
28	6028913	Cable assembly, pressure and vacuum enable solenoids

Figure 8.2-10 Sample Access and Reservoir Module (See Table 8.2-10)

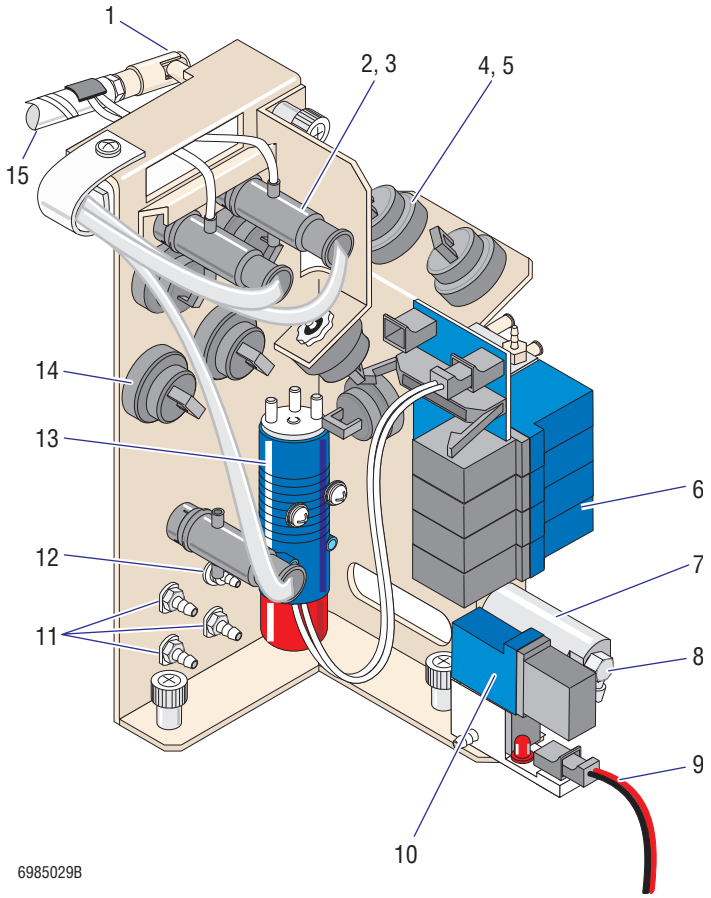

Table 8.2-10 Sample Access and Reservoir Module (See Figure 8.2-10)

Item	Part Number	Description
Components Illustrated		
1	2508013	Fitting, quick disconnect, flex arms/joint socket, 0.25 ball
2	1023417	Hardware, mount, fluid detector, CP
3	6805569	Fluid detector, S/A
4	6857096	Valve, pinch, single tube, black, S/A
5	6232382	Fitting, Luer, locknut,1/4-28, bulkhead to Luer, white nylon
6	6232850	Manifold, solenoid valve, 4 position
7	6211015	Actuator, valve, pilot, 7/16 bore, nickel plated
8	6232829	Fitting, elbow, miniature, adjustable, 2 mm (5/64) i.d. hose barb to 10-32 thd, brass
9	6806194	Cable, SOL120 to SlideMaker Interface card
10	6214112	Valve, solenoid, pneumatic, 3-way NC, 0-50 psi
11	1018021	Fitting, union, 0.062 i.d. to 0.082 i.d., bulkhead
12	6806993	Fitting, feed-thru, small i.d. tubing
13	6232856	Valve, solenoid, hydraulic, 3-way NC, ppt, 30 psi
14	6806850	Valve, pinch valve, single tube, grey, S/A
15	6806096	Reservoir rod, S/A
Components Not Illustrated		
N/A	1023662	Tubing, collar, silicone
N/A	1024575	Tubing, sleeve, for mini pinch valve
N/A	3230059	Tubing, special, 50 durometer hardness
N/A	3230068	Tubing, special, 8 ribbon
N/A	6805067	Fitting, T, yellow
N/A	6855763	Valve, pinch, standard, pull apart, assembly

Figure 8.2-11 Slide Elevator Module (See Table 8.2-11)

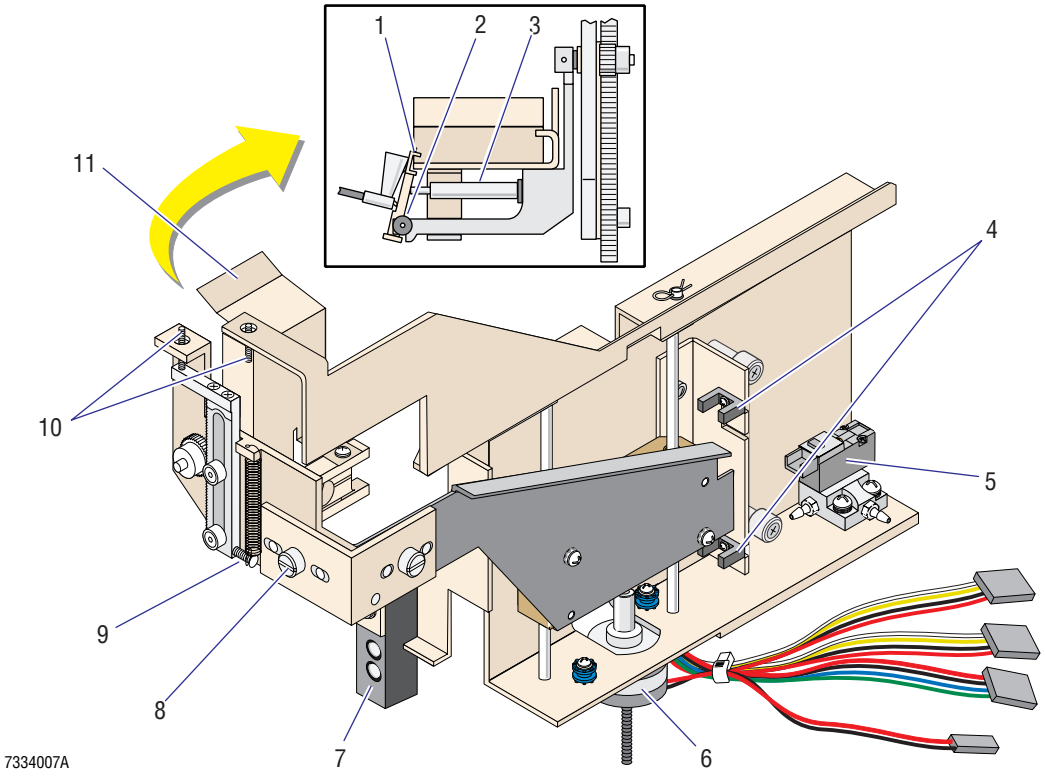

Table 8.2-11 Slide Elevator Module (See Figure 8.2-11)

Item	Part Number	Description
Components Illustrated		
	7000714	Module, Slide Elevator
1	1024016	Custom Part, arm, slide retaining (gripper), CP
2	1024308	Spring, torsion, slide, CP
3	1023783	Cylinder, slide retaining, CP
4	6028749	Cable assembly, 38 cm (15.0 in.)
5	6214109	Valve, solenoid, pneumatic, 3-way NC, 0-57 psi, 24 Vdc
6	3533110	Motor, linear, digital, 12 Vdc
7	1024087	Switch, light modulation, CP
8	2851227	Screw, shoulder, 4-40 x 0.28, 0.125 l
9	2527787	Spring, extension
10	2852343	Screw, setscrew, 4-40 x 0.50, self-locking
11	6806156	Plaren, S/A
Components Not Illustrated		
N/A	6214112	Valve, solenoid valve, pneumatic, 3-way NC, 0-50 psi, 24 Vdc
N/A	6232159	Choke, pneumatic, 0.004, yellow
N/A	6232352	Fitting, union, plastic, 0.062 i.d. (See Figure 8.2-19, item 4.)
N/A	6232381	Fitting, elbow, hose, barb
N/A	6805693	Switch and lever extension assembly (See Figure 8.2-6, item 5.)

Figure 8.2-12 Slide and Smear Module (See Table 8.2-12)

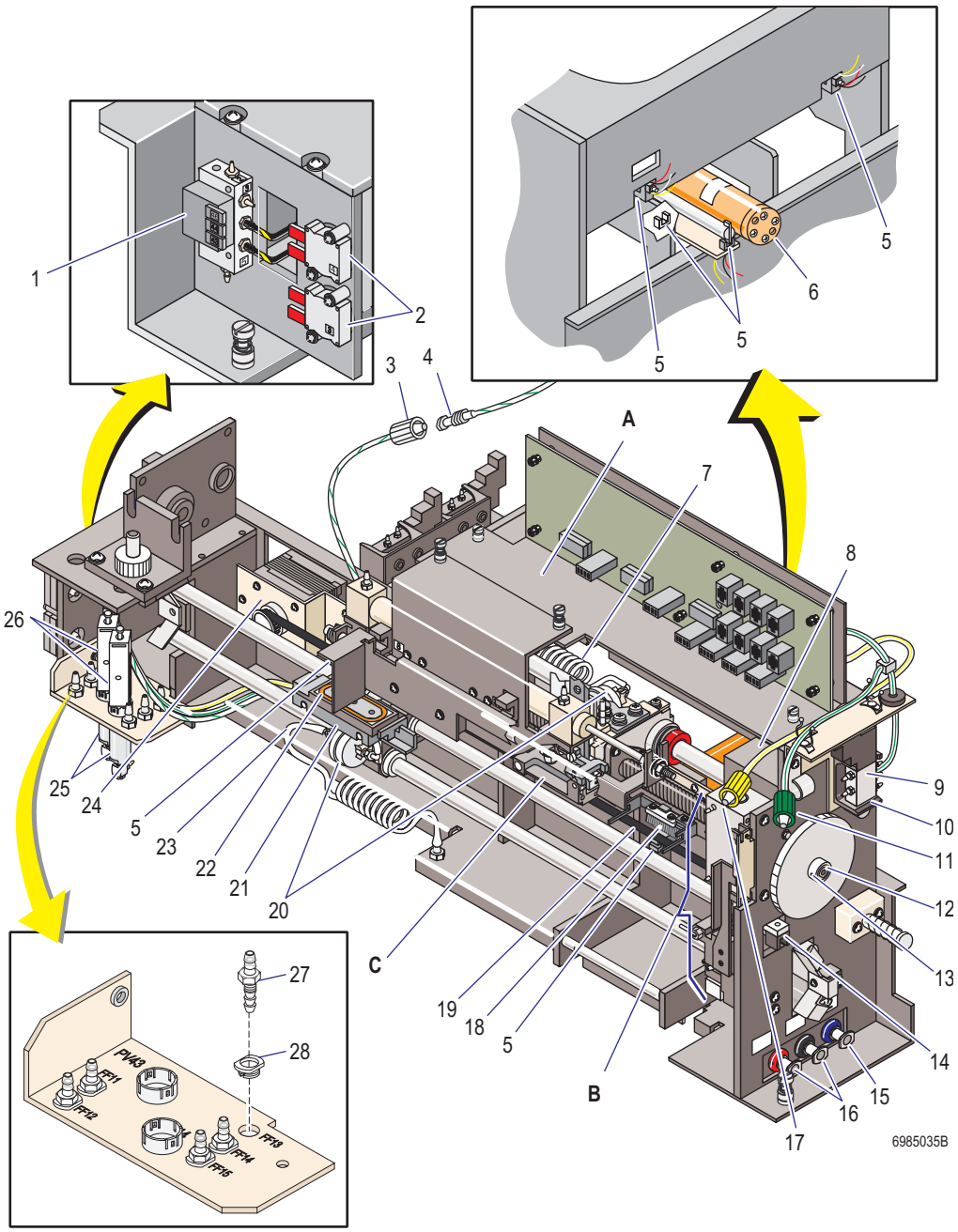

Figure References

A Figure 8.2-13, Upper cassette transfer mechanism and encoder

B Figure 8.2-14, Dispense probe mechanism and rinse block

C Figure 8.2-15, Smear truck

Table 8.2-12 Slide and Smear Module (See Figure 8.2-12)

Item	Part Number	Description
1	6232837	Valve, solenoid, three on a partitioned manifold, S/A
2	5115016	Switch, vacuum/pressure, high vacuum
3	6232434 6232436	Fitting, Luer, male, lock ring, white nylon (use with PN 6232436 and PN 6232435) Fitting, Luer, external to 0.094 i.d., hose barb, plastic
4	6232435	Fitting, Luer, 0.094 i.d, male
5	6028747	Cable assembly, sensor, 53 cm (21.0 in.)
6	6232833	Cylinder, air, 2.00 stroke, 0.50 bore, double acting, guided
7	1024058 1024310	Tubing, ribbon (double coiled), CP (See Figure 8.2-15, item 4) Tubing, flex (coiled), truck, CP (See Figure 8.2-15, item 1)
8	3505050	Motor, dc, brushless, 24 Vdc, 10 K rpm, 3.86 oz-in.
9	6232958	Valve, solenoid valve, pneumatic, 5-way NO, spool, 100 psi, 10 cfm, 24 Vdc
10	1021414	Hardware, clip, 5-way solenoid valve, CP
11	6232660 6232664	Fitting, Luer, male, to 0.094 i.d. hose barb, polypropylene Fitting, Luer, male, lock ring, green nylon
12	2527729	Gear, spur, 48 pitch, 120 teeth
13	2807004	Screw, setscrew, 6-32 x 0.125
14	6028749	Cable assembly, sensor, 38 cm (15.0 in.)
15	6232852	Fitting, Luer, internal to 0.094 hose barb
16	6232827 6232382	Fitting, Luer, internal to 0.063 hose barb Fitting, Luer, locknut, 1/4-28, bulkhead to Luer, white nylon
17	6232660 6232662	Fitting, Luer, male, to 0.094 i.d. hose barb, polypropylene Fitting, Luer, male, lock ring, yellow nylon
18	6806079	Brush assembly
19	2527726	Belt, timing 40 DP, 97.828 cm (38.515 in.) L
20	6232865	Filter, air
21	1024338	Shuttle, S/A
22	2527822	O-ring, shuttle
23	1023707	Tubing, special, coiled, 0.38 i.d. x 1.25 cm (0.49 in.) L, CP
24	3505055	Motor, stepper, 1.8 degree, 6 Vdc, 3000 rpm, 36.1 oz-in.
25	6211015	Actuator, valve, pilot, 7/16 bore, nickel plated
26	6855763	Valve, pinch, standard, pull apart, assembly
27	1005697	Fitting, union, 0.062 i.d. to 0.062 i.d., bulkhead
28	1016486	Fitting, isolator, 10-32, CP

Figure 8.2-13 Upper Cassette Transfer Mechanism and Encoder (See Table 8.2-13)

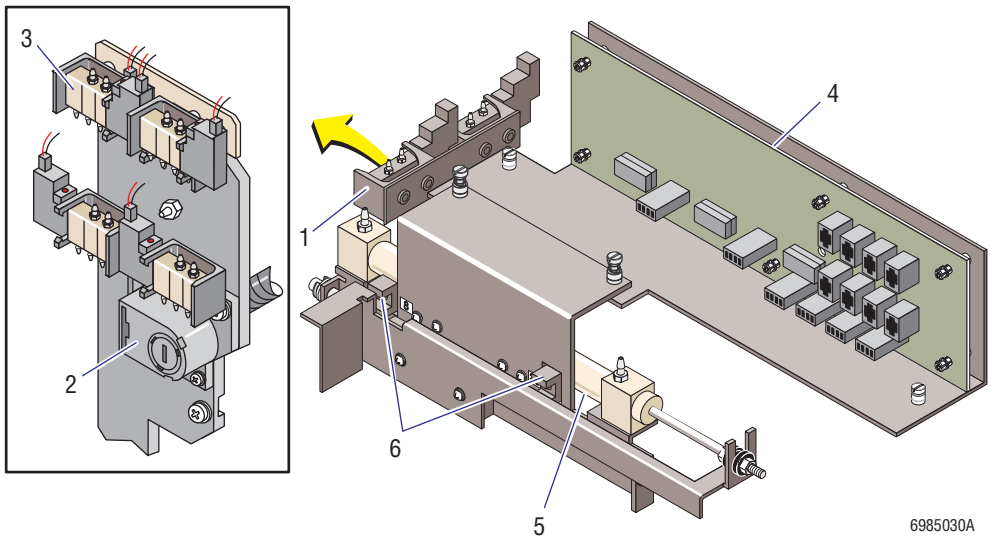

Table 8.2-13 Upper Cassette Transfer Mechanism (See Figure 8.2-13)

Item	Part Number	Description
1	1021414	Hardware, clip, 5-way solenoid valve, CP
2	4837095	Sensor, encoder, optical, three-channel
3	6232958	Valve, solenoid, pneumatic, 5-way NO, spool, 100 psi, 10 cfm, 24 Vdc
4	6706744	PCB, Smear/Transport Interface
5	6232747	Cylinder, air, 4.5 stroke, 3/8 bore, double acting, 125 psi max
6	6028748	Cable assembly, sensor, 25.4 cm (10.0 in.)

Figure 8.2-14 Dispense Probe Mechanism and Rinse Block (See Table 8.2-14)

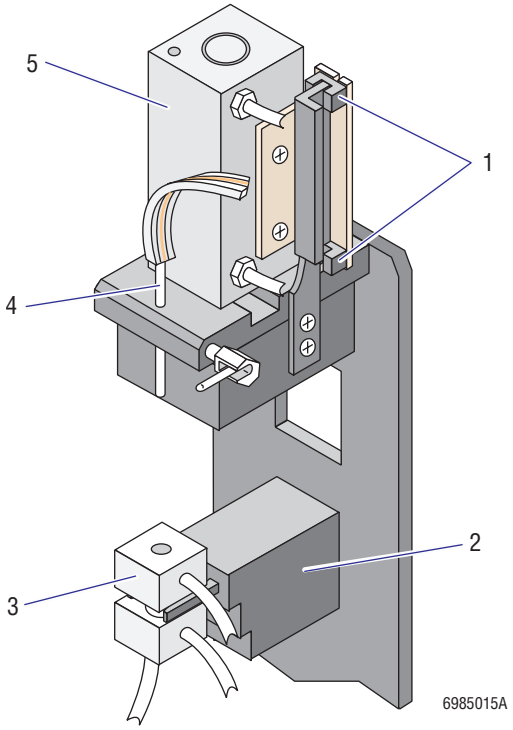

Table 8.2-14 Dispense Probe Mechanism and Rinse Block (See Figure 8.2-14)

Item	Part Number	Description
1	6028748	Cable assembly, sensor, 25.4 cm (10.0 in.)
2	6805062	Hardware, support, dispense backwash trough, S/A
3	6805063	Rinse block, dispense, self aligning, S/A
4	1022962	Probe, dispense
5	6232755	Cylinder, air, 1.5 stroke, 0.5 bore, double acting, aluminum

Figure 8.2-15 Smear Truck Assembly (See Table 8.2-15)

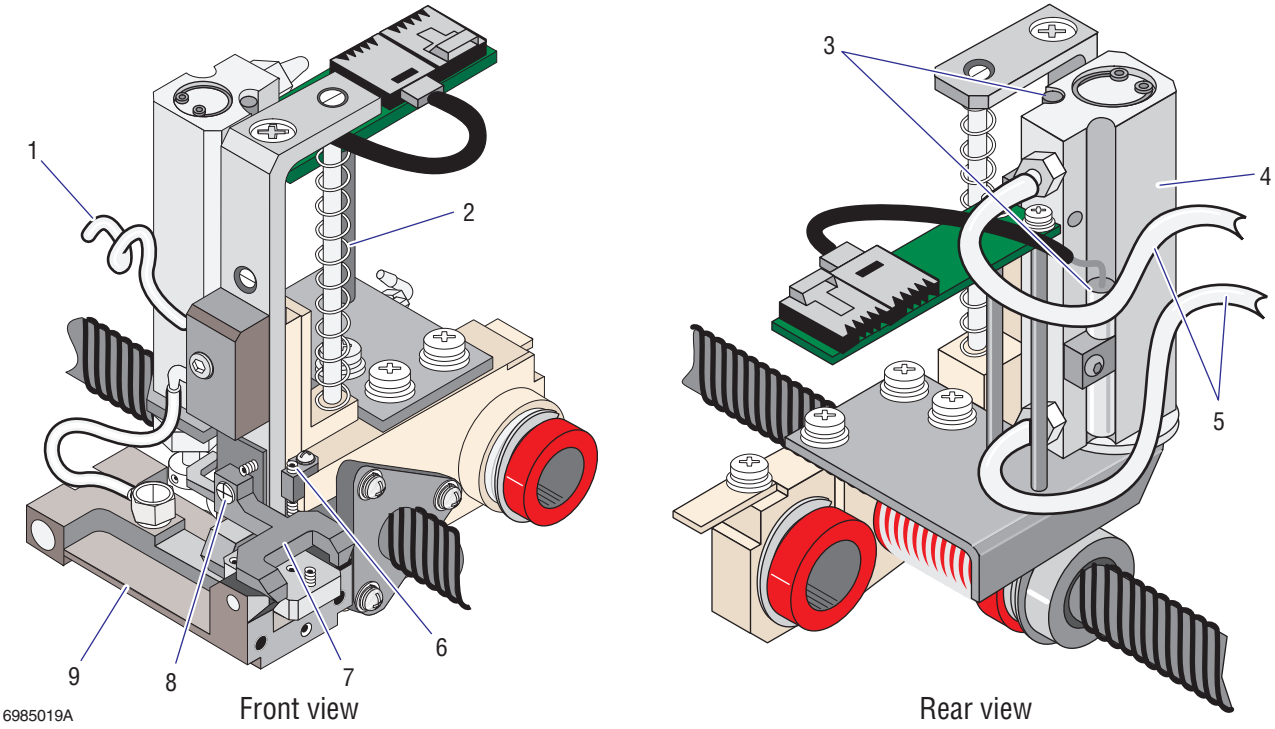

Table 8.2-15 Smear Truck Assembly (See Figure 8.2-15)

Item	Part Number	Description
Components Illustrated		
	7000712	Truck, smear, assembly
1	1024310	Tubing, flex (coiled), truck, CP
2	2527784	Spring, compression, 0.300 o.d. x 2.50 l x 0.22 w (for smear truck)
3	6028907	Cable assembly, smear truck sensors, SEN18 and SEN19
4	1024369	Cylinder, lift, truck, CP
5	1024058	Tubing, ribbon (double coiled), CP
6	2852395	Screw, setscrew, 4-40 x 0.38, self-locking (lift-up setscrew)
7	6806635	Custom Part, tilt lever
8	1024366	Screw, shoulder, 4-40, 0.125 diameter (tilt-lever screw)
9	1024596	Truck, smear, with ball bearings, S/A
Components Not Illustrated		
	2512026	O-ring, smear truck

Figure 8.2-16 Label Printer Module (See Table 8.2-16)

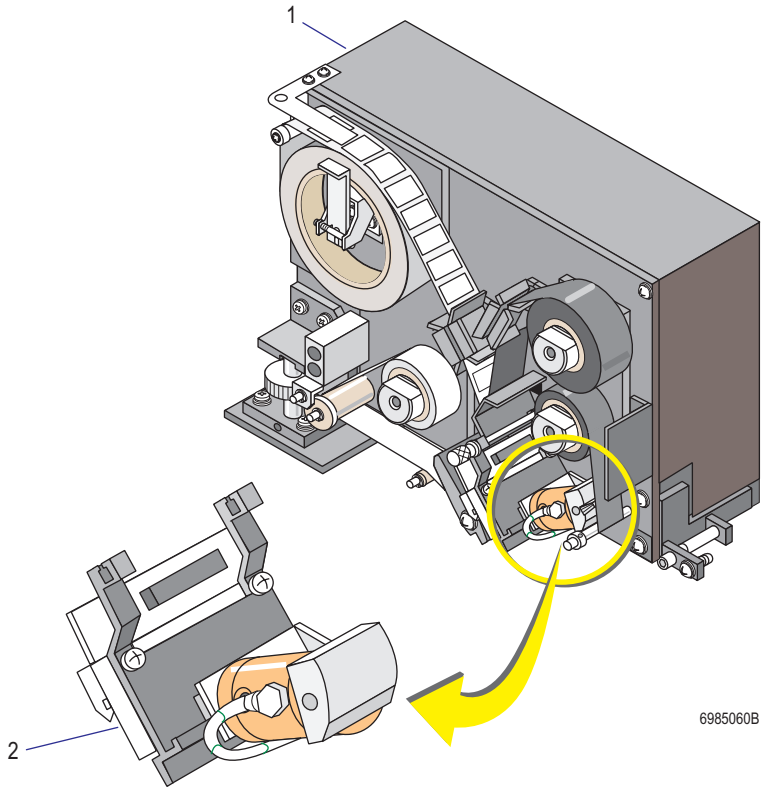

Table 8.2-16 Label Printer Module (See Figure 8.2-16)

Item	Part Number	Description
1	7000707	Printer assembly
2	2016912	Printhead, thermal transfer

Figure 8.2-17 Covers and Doors on the GEN•S SM SlideMaker (Table 8.2-17)

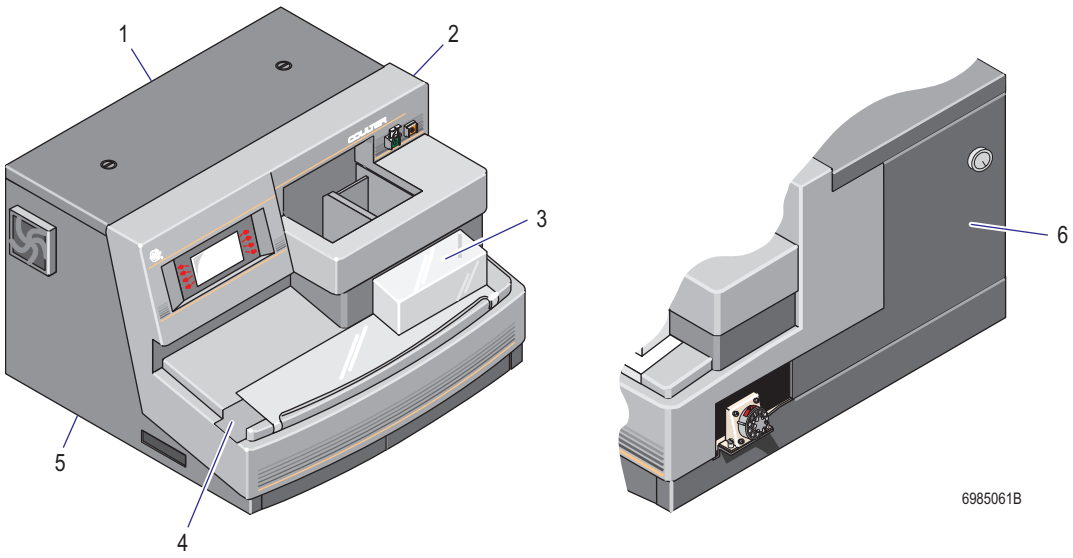

Table 8.2-17 Covers and Doors on the GEN•S SM SlideMaker (See Figure 8.2-17)

Item	Part Number	Description
1	6805795	Cover, top rear panel, electronics, S/A, GEN•S SM SlideMaker
2	6806071	Cover, unicover, molded, S/A, GEN•S SM SlideMaker
3	6806043 6806847	Cover, basket, S/A, for a GEN•S SM SlideMaker without a SlideStainer Cover, basket, S/A, for a GEN•S SM SlideMaker with a SlideStainer
4	6805776	Cover, SlideStainer interface, GEN•S SM SlideMaker
5	6805796	Door, left side panel, S/A, GEN•S SM SlideMaker
6	6805797	Door, right side panel, S/A, GEN•S SM SlideMaker

Figure 8.2-18 Covers and Doors on the LH SlideMaker (See Table 8.2-18)

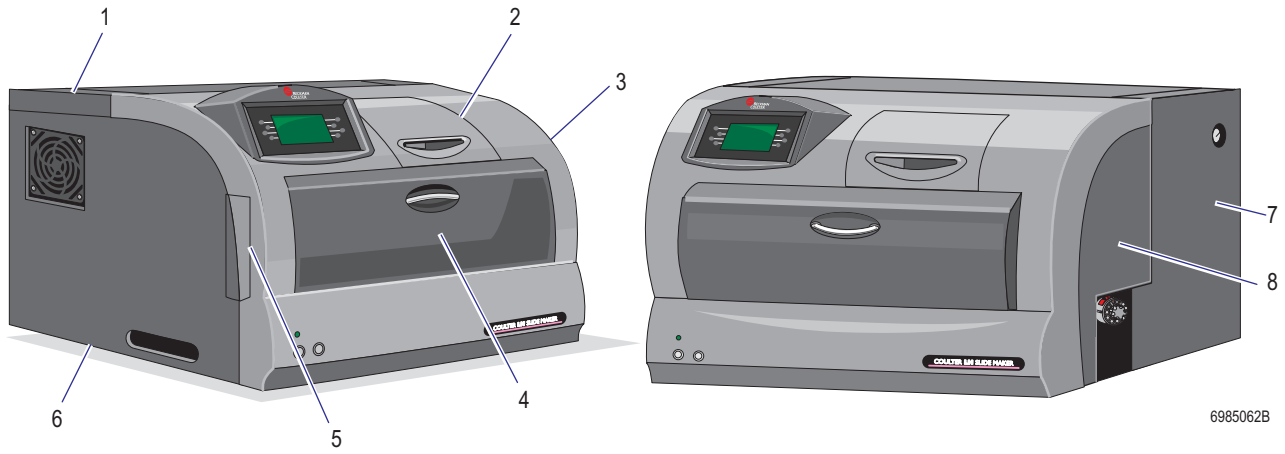

Table 8.2-18 Covers and Doors on the LH SlideMaker (See Figure 8.2-18)

Item	Part Number	Description
1	6807063	Cover, top panel, LH SlideMaker
2	6807061	Cover, cassette access door, LH SlideMaker
3	6807058	Cover, main, LH SlideMaker
4	6807062	Cover, basket queue door, LH SlideMaker
5	6807267	Cover, SlideStainer interface, LH SlideMaker
6	6807059	Door, left side cover, LH SlideMaker
7	6807060	Door, right side, rear cover, LH SlideMaker
8	6807272	Cover, right side, service access, LH SlideMaker

Figure 8.2-19 Chokes and Fittings (See Table 8.2-19)

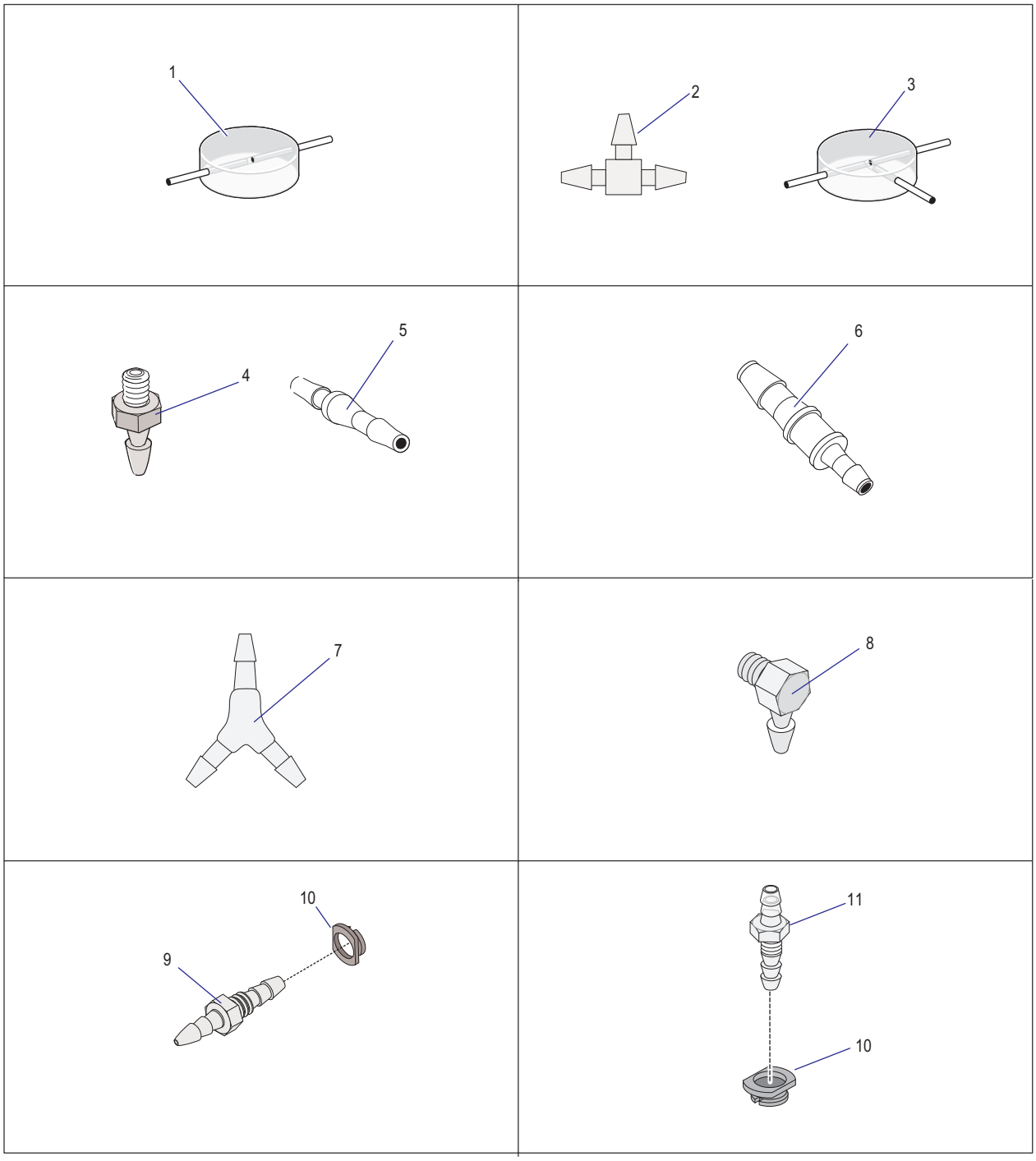

Table 8.2-19 Chokes and Fittings (See Figure 8.2-19)

Item	Part Number	Description
1	6805272	Fitting, union, clear, for 0.03 tubing
2	6232051	Fitting, T, 0.094 i.d. tubing, polypropylene
3	6805067	Fitting, T, clear
4	6232697	Fitting, choke, pneumatic, brown, 0.006 orifice, 0.063 i.d.barb to 10-32 thd, brass
5	6232158	Choke, pneumatic, orange, 0.006 orifice, 0.062 i.d. barbed ends
6	6232352	Fitting, union, plastic, 0.062 i.d. (reducer)
7	1018245	Fitting, Y, 0.093 i.d. to 0.125 to 0.125 i.d. tubing, white
8	6232829	Fitting, elbow, miniature, adjustable, 2 mm (5/64) i.d. hose barb to 10-32 thd, brass
9	1005699	Fitting, feed-thru, metal, 0.093 i.d. tubing, w/ 10-32 thd
10	1016486	Fitting, feed-thru isolator, white
11	1005697	Fitting, union, 0.062 i.d. to 0.062 i.d., bulkhead

Figure 8.2-20 Common Valves (See Table 8.2-20)

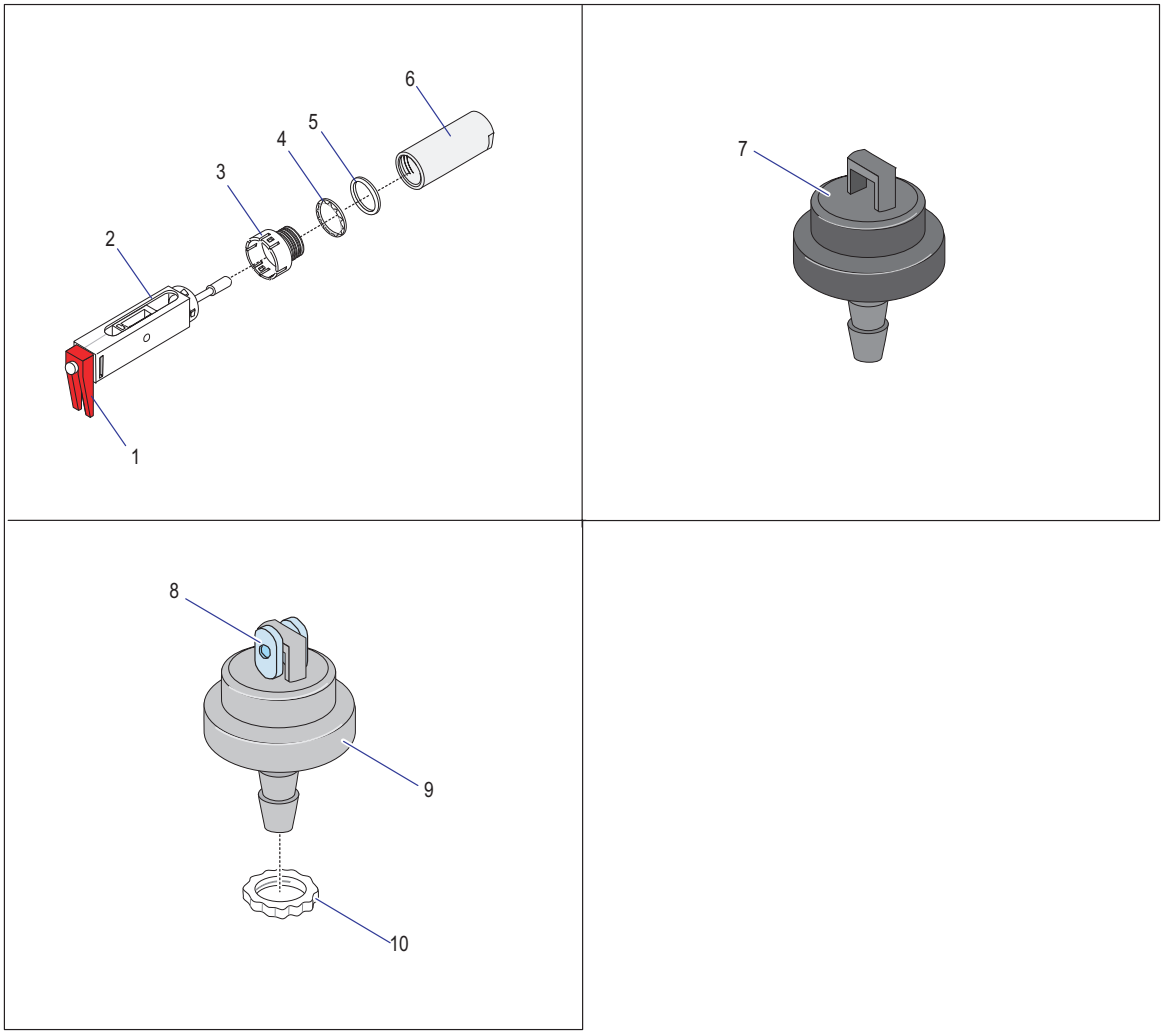

Table 8.2-20 Common Valves (See Figure 8.2-20)

Item	Part Number	Description
1	1008315	Valve, pinch, deactivator clip, red, holds pinch valve open
2	6855763	Valve, pinch, white, standard
3	1017501	Valve, pinch, mount
4	2826030	Washer, I-tooth, #47, 0.47 i.d. x 0.60 o.d. x 0 020 thk
5	6216012	Washer, cylinder, 0.500 i.d. x 0.562 o.d. x 0.062 thk
6	6211015	Actuator, 1-tubing pinch valve
7	6857096	Valve, pinch, 1-tube, black
8	1024575	Tubing, sleeve, for mini pinch valve, CP
9	6806850	Valve, pinch, single tube, grey, S/A
10	6232382	Fitting, Luer, locknut,1/4-28, bulkhead to Luer, white nylon

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Fluid Detector Voltage Specifications

The fluid detector output voltage ranges for the various fluids are:

- ≤200 mV = blood
- 300 mV to 500 mV = air
- 700 mV to 1000 mV = diluent

During calibration, all of the fluid detectors must read >0.920 V but <0.980 V on diluent.

Label Printer Module Adjustments

Printer Height above the Slide Specification

At the printer position, the clearance between the slide on the shuttle and the label and printer rolls should be 1 mm (0.04 in.), the thickness of a glass slide.

Top-of-Form Sensor Voltage Settings

Table A.1-1 Top of Form Sensor Voltage Settings

Test Point	Ground	Testing Conditions	Adjustment	Acceptable Votage
T2	TGND	Label blocking top of form sensor	R10	2.5 Vdc ±0.1
T1	TGND	Label blocking top of form sensor	R1	>3.25 Vdc
T1	TGND	Label liner blocking top of form sensor	R1	<1.9 Vdc

Pressure and Vacuum Tolerances

Table A.1-2 Pressure and Vacuum Tolerances

Pneumatics Measured and Displayed	Tolerance Range
5 psi	4.80 to 5.20 psi
30 psi	27.00 to 33.00 psi
Raw (unregulated, high) vacuum	17.00 to 32.00 in. Hg
Regulated (low) vacuum 1	17.00 to 18.00 in. Hg
Regulated (low) vacuum 2	6.30 to 6.70 in. Hg

Shuttle Position Settings

Dispense Position Specifications

The dispense position of the shuttle should be set so that the blood drop is dispensed 25 mm (1 in.) from the right edge of the slide.

Shuttle Offset Settings

Table A.1-3 Shuttle Position Nominal Settings

Shuttle Position	Nominal Setting	Tolerance
Dispense	09	N/A
Home (smear)	09	±1
Print	29	N/A

Smear Module Input Tolerances

Voltage Inputs

+24 Vdc ±1.20, I = 3 A maximum
+5 Vdc ±0.25

Unregulated Vacuum Input

15 in. Hg to 29 in. Hg

Tubing Length Specifications

The tubing from FU1 to VL8 must measure 3.81 to 4.45 cm (1.50 to 1.75 in.).

Voltage Tolerances

Ac Input Line Voltages

90 - 264 V, 48 - 62 Hz

Power Supply

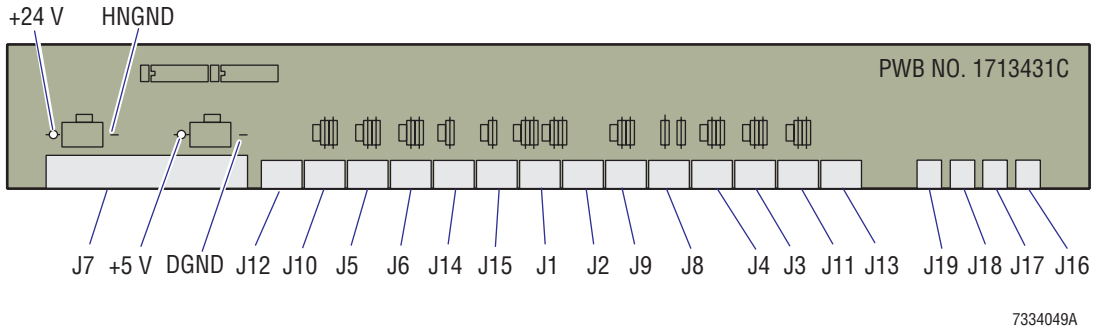
Table A.1-4 Power Supply Voltage Tolerances

Voltages Measured and Displayed	Tolerance Range
+5 V	4.75 to 5.25 V
+24 V	22.80 to 25.20 V
+15 V	14.25 to 16.75 V
-15 V	-15.75 to -14.75 V

A.2 CIRCUIT CARD LAYOUTS WITH KEY COMPONENT DESCRIPTIONS

Basket Transport Interface Card

Figure A.2-1 Basket Interface Card Components



Connectors

Table A.2-1 Basket Transport Interface Card Connectors

J No.	Connects to:	J No.	Connects to:
J1	Rear belt position sensor, SEN31	J11	Right crossover home sensor, SEN40
J2	Front belt position sensor, SEN32	J12	Front stepper motor, M3
J3	Basket present rear right sensor, SEN33	J13	Rear stepper motor, M4
J4	Basket present front right sensor, SEN34	J14	Basket cover interlock sensor, SEN54
J5	Basket present rear left sensor, SEN35	J15	Spare sensor, SEN55
J6	Basket present front left sensor, SEN36	J16	Right crossover cylinder solenoid, SOL57
J7	Basket/Transport Interface card, J7	J17	Left crossover cylinder solenoid, SOL58
J8	Basket index sensor, SEN37	J18	Not used. Wired to receive signals for SOL61, but SOL61 is now connected to the Smear/Transport Interface card.
J9	Spare sensor, SEN38. **Do not** plug a sensor into this port.	J19	Spare solenoid, SOL62
J10	Left crossover home sensor, SEN39		

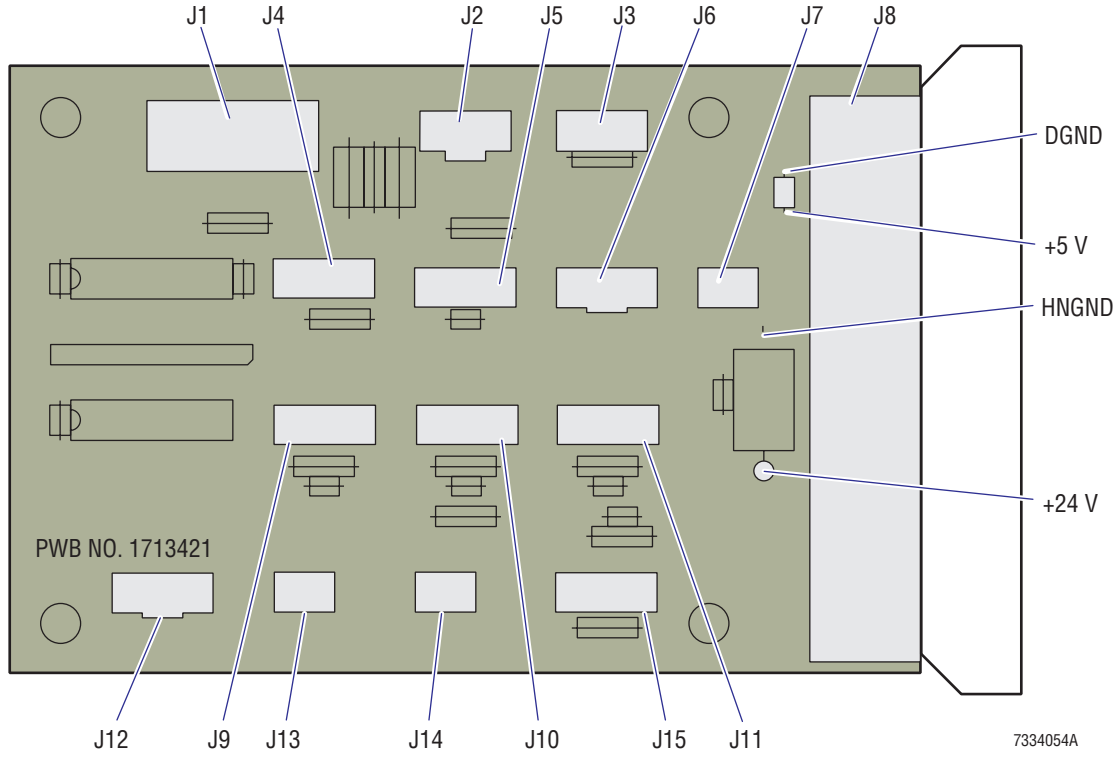
Test Points

Table A.2-2 Basket Transport Interface Card Test Points

TP	Signal Name	TP	Signal Name
HNGND	HIGH NOISE GROUND	+5V	POWER SUPPLY VOLTAGE
+24V	POWER SUPPLY VOLTAGE	DGND	DIGITAL GROUND

Dryer Interface Card

Figure A.2-2 Dryer Interface Card Components



Connectors

Table A.2-3 Dryer Interface Card Connectors

J No.	Connects to:	J No.	Connects to:
J1	Heatsink assembly (on Heat Source card)	J9	Gripper overextended sensor, SEN46
J2	Temperature Sensor card	J10	Platen elevator down, SEN45
J3	Dryer Exit Sensor card, SEN49	J11	Platen elevator up sensor, SEN44
J4	Spare sensor, SEN42	J12	Dryer stepper motor, M5
J5	Vertical slide sensor, SEN41	J13	Spare solenoid, SOL59
J6	Platen elevator stepper motor, M2	J14	Gripper release solenoid, SOL60
J7	Dryer fan	J15	Spare sensor, SEN43
J8	Main Distribution card, J8		

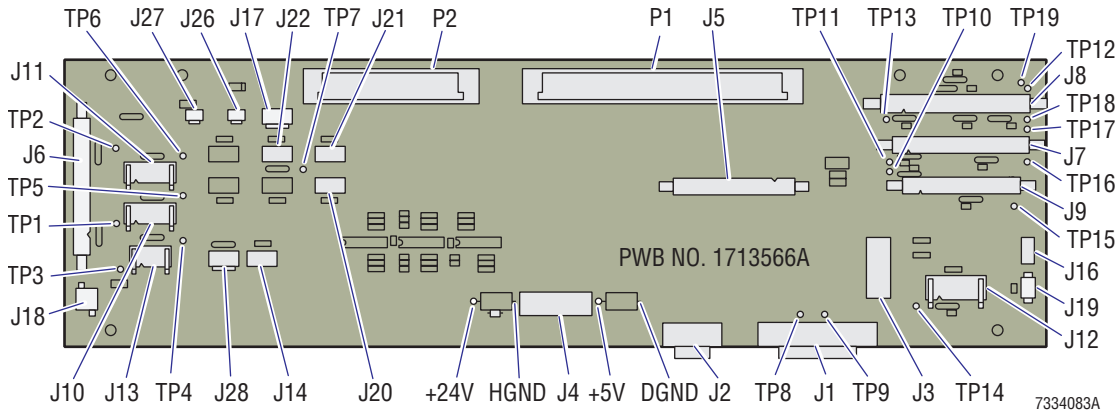
Test Points

Table A.2-4 Dryer Interface Card Test Points

TP	Signal Name	TP	Signal Name
HNGND	HIGH NOISE GROUND	+5V	POWER SUPPLY VOLTAGE
+24V	POWER SUPPLY VOLTAGE	DGND	DIGITAL GROUND

Main Distribution Card

Figure A.2-3 Main Distribution Card Components



Connectors

Table A.2-5 Main Distribution Card Connectors

J No.	Connects to:	J No.	Connects to:
P1	System Control card, J1	J12	Main Fluidics Interface card, J1
P2	System Control card, J2	J13	Spare manifold interface, SOL37-SOL40, SOL51, SOL64
J1	GEN•S System, Diluter 3 card, J2	J14	Reset switch sensor, SEN13 (S13)
J2	Auxiliary connector for auxiliary service terminal	J16	Main cover interlock switch, SEN53 (S53)
J3	Label Printer module (data)	J17	Ejector stepper motor, M6
J4	Power Supply Monitor card (power), J4	J18	Vacuum reservoir full sensor, SEN51, and vacuum drain solenoid, SOL63
J5	Power Supply Monitor card (data), J5	J19	Main fan
J6	Smear/Transport Interface card, J6	J20	Spare sensor, SEN56
J7	Basket Transport Interface card, J7	J21	Spare sensor, SEN57
J8	Dryer Interface card, J8	J22	Spare sensor, SEN52
J9	Slide Ejector Interface card, J9	J26	Spare solenoid, SOL40 (SOL40 is not physically used. The SOL40 signal is used to control SOL117 in the Diluter.)
J10	Dispense 2 Manifold card, J1	J27	Spare solenoid, SOL39 (SOL39 is not physically used. The SOL39 signal is used to control SOL116 in the Diluter.)
J11	Dispense 1 Manifold card, J1	J28	Power enable switch, S2

Test Points

Table A.2-6 Main Distribution Card Test Points

TP	Signal Name	TP	Signal Name
TP1	+5VST	TP13	+5VD1
TP2	+24VST	TP14	+24VJ12
TP3	+24VJ10	TP15	+5VDIST
TP4	+24VJ13	TP16	+24VBT
TP5	+24VJ10	TP17	+24VDRY1
TP6	+24VJ11	TP18	+24VD3
TP7	+5VDIST	TP19	+15VDRY
TP8	SM_PWR	+24V	POWER SUPPLY VOLTAGE
TP9	HST_PWR	HNGND	HIGH NOISE GROUND
TP10	+5VSE	+5V	POWER SUPPLY VOLTAGE
TP11	-5VBT	DGND	DIGITAL GROUND
TP12	+24VDRY2	AGND	ANALOG GROUND

Main Fluidics Interface Card

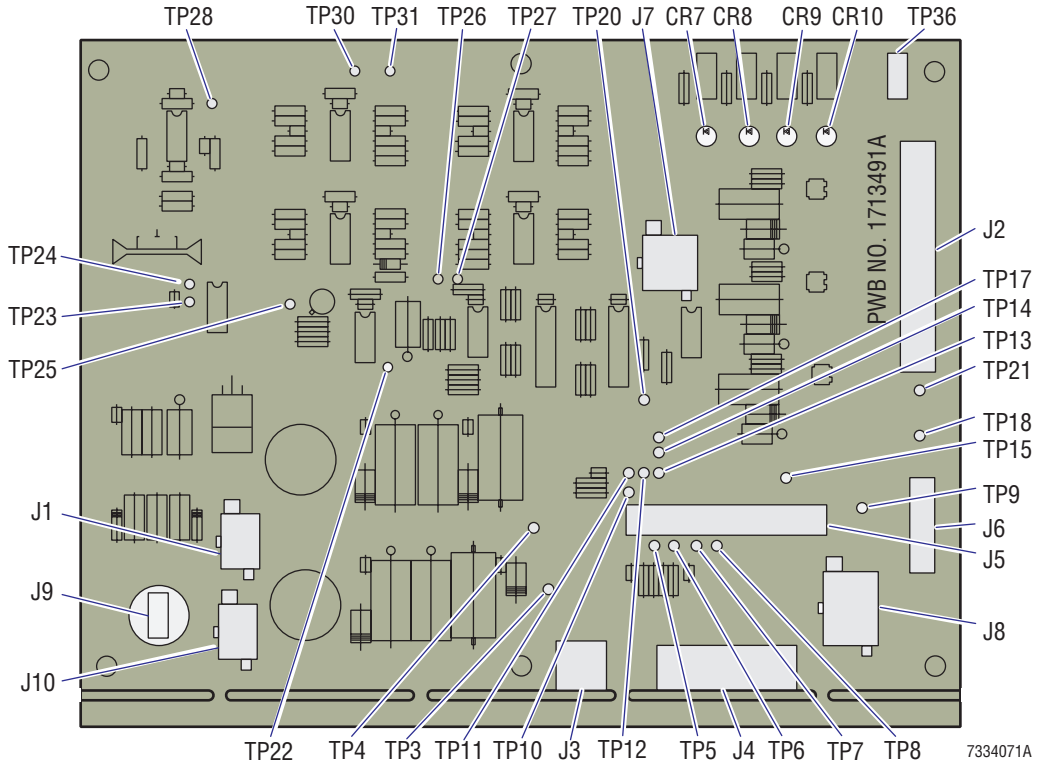
Connectors

Table A.2-7 Main Fluidics Interface Card Connectors

J No.	Connects to:
J1	Main Distribution card, J12
J3	Diluent full sensor, SEN47
J4	Cleaning agent full sensor, SEN48
J5	Not used
J6	Not used

Power Supply Monitor Card

Figure A.2-4 Power Supply Monitor Card Components



Connectors

Table A.2-8 Power Supply Monitor Card Connectors

J No.	Function	Signals by Pin		
		Pin No.	**Signal/Type/Direction**	**Reference**
J1	Provides power and signals to Printer Label module.	1	5 V	+5V
		2	Ground	GROUND
		3	Label direction	PRN_CW
		4	+24 V (switched)	+24VSW
		5	Ground	GROUND
		6	Printer clock	PRN_CLK

Table A.2-8 Power Supply Monitor Card Connectors *(Continued)*

J No.	Function	Signals by Pin		
		Pin No.	**Signal/Type/Direction**	**Reference**
J2	Provides power to and analog signals from Pneumatic Power Supply Monitor cards.	1	+24 V (switched)	+24VSW
		2	17.5” vacuum proportional voltage (5.0 Vdc represents 20.00” Hg), analog, in/out	LOW_VAC2
		3	5 psi proportional voltage (5.0 Vdc represents 8.0 psi), analog, in/out	5PSI
		4, 5, 12, 13, 20, 23, 28	+15 V	+15V
		6, 7, 14, 15, 21, 22, 30	-15 V	-15V
		8, 9, 16, 17, 24, 25, 27, 29	Ground	GROUND
		10	6.5” vacuum proportional voltage (5.0 Vdc represents 8.0” Hg), analog, in/out	LOW-VAC1
		11	30 psi proportional voltage (5.0 Vdc represents 35.0 psi), analog, in/out	+30PSI
		18	Unregulated vacuum proportional voltage (5.0 Vdc represents 32” Hg), analog, in/out	HIGH_VAC
		19	Analog channel input #17	SPARE #1
		26	Analog channel input #18	SPARE #2
J3	NOT USED - An option to interface to an EVR. The transducer output would replace the LOW_VAC1 signal from J2.	N/A	N/A	N/A
J4	Provides the SlideMaker with conditioned and control power supplies.	1, 3, 4, 8, 9, 11, 12, 16	Ground	GROUND
		2, 10	+24 V (switched)	+24VSW
		5, 13	+5 V	+5V
		6, 14	+15 V	+15V
		7, 15	-15 V	-15V

Table A.2-8 Power Supply Monitor Card Connectors *(Continued)*

J No.	Function	Signals by Pin		
		Pin No.	**Signal/Type/Direction**	**Reference**
J5	Provides and receives signals from the System Control card.	1	Scaled 5 V supply (4.0 Vdc represents 5 Vdc), analog, output	+5VSCALED
		2	5 psi proportional voltage (5.0 Vdc represents 8.0 psi), analog, in/out	5PSI
		3	Scaled 24 V supply (4.0 Vdc represents 24.0 Vdc), analog, output	+24VSCALED
		4	30 psi proportional voltage (5.0 Vdc represents 35 psi), analog, in/out	+30PSI
		5	Scaled 15 V supply (4.0 Vdc represents 15.0 Vdc), analog, output	+15VSCALED
		6	Unregulated vacuum proportional voltage (5.0 Vdc represents 32.0” Hg), analog, in/out	HIGH_VAC
		7	Scaled -15 V supply (4.0 Vdc represents -15.0 Vdc), analog, output	-15VSCALED
		8	6.5 in. vacuum proportional voltage (5 Vdc represents 8.0” Hg), analog, in/out	LOW_VAC1
		9	Buffered 2.5 V reference	+2.5VSCALED
		10	17.5” vacuum proportional voltage (5.0 Vdc represents 20.0” Hg), analog, in/out	LOW_VAC2
		11	Ac line fail (logic LOW = power failed), digital, output	POWER_FAIL\
		12	Reset due to 5 V fail	RESET_IN\
		13	Printer clock	PRN_CLK
		14	Label direction	PRN_CW
		15	Control to disable 24 V supply	+24VSW_DIS
		16	Alarm control	ALARM\
		17	Control for future EVR	REG_CV
		18	Control to enable pneumatic pressure	PRES_EN\
		19	Analog channel input #18	SPARE #2
		20	Control to enable vacuum supply	VAC_EN\
		21	-15 V supply monitor	-15V_OK
		22	Dc outputs disable (logic LOW disables dc outputs), digital, input	INHIBIT_PWR\
		23	+15 V supply monitor	+15V_OK
		24	NOT USED (Analog channel input #16)	ACH_B16
		25	+24 V supply monitor	+24V_OK
		26	Analog channel input #17	SPARE #1

Table A.2-8 Power Supply Monitor Card Connectors *(Continued)*

J No.	Function	Signals by Pin		
		Pin No.	**Signal/Type/Direction**	**Reference**
J6	Provides power supply's control and reference.	1	N/A +24 V sense	+SENSE_V2
		2	N/A 24 V sense return	-SENSE_V2
		3	+5 V sense (remote sense for +5 V supply), analog, input	+SENSE_V1
		4	5 V sense return	-SENSE_V1
		5	Dc outputs disable (logic LOW disables dc outputs), digital, input	INHIBIT_PWR\
		6	Output disable return	INHIB_RET
		7	Ac line fail (logic LOW = power failed), digital, output	POWER_FAIL\
		8	Line fail return	POWER_FAIL_RET
J7	Provides the control to enable the pneumatic supplies for the SlideMaker.	1	Vacuum solenoid power	VAC_PWR
		2	Vacuum enable driver	VAC_EN
		3, 6, 9	NOT USED	
		4	Pressure (1) solenoid power	P1_PWR
		5	Pressure enable driver	P_EN
		7	Pressure (2) solenoid power	P2_PWR
		8	Pressure enable driver	P_EN
J8	Receives power from the power supply for distribution to the SlideMaker.	1, 5	+24 V	24VIN+
		2, 6	+5 V	5VIN+
		3	+15 V	15AVIN+
		4	-15 V	15BVIN-
		7	Ground	15AVIN-
		8	Ground	15BVIN+
		9, 10	Ground	24VIN-
		11, 12	Ground	5VIN_
J9	NOT USED - An option to mount the alarm at a remote location if the sound level is not adequate when the covers are in place.			
J10	Identical to J1.			

LEDs

Table A.2-9 Power Supply Monitor Card LEDs

LED	Dc Supply	ON Indicates	LED	Dc Supply	ON Indicates:
CR7	+15 V	+13.2 V to +16.9 V present	CR9	+5 V	+4.4 V to +5.6 V present
CR8	+24 V	+21.6 V to +28.1 V present	CR10	-15 V	-16.8 V to -13.2 V present

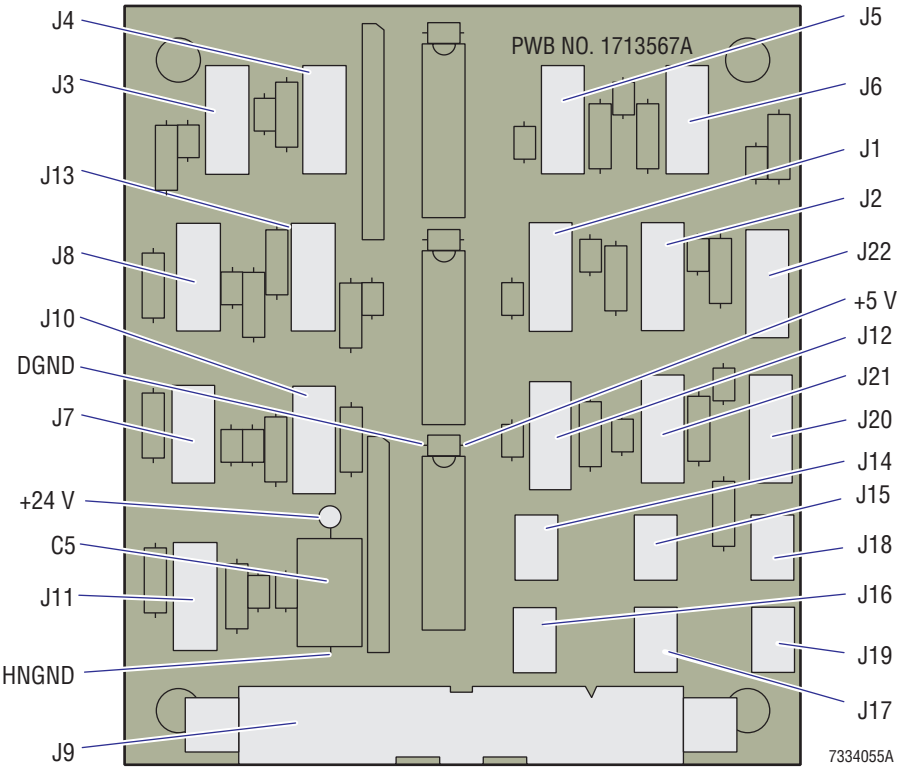
Test Points

Table A.2-10 Power Supply Monitor Card Test Point Signals

TP	Signals	TP	Signals
TP3	+5VDC	TP21	+24VDC
TP4	PRN_CW (Label Printer module's stepper motor direction control)	TP22	BUFFERED 2.5 VOLTS REFERENCE
TP5	+5VSCALED (+4.0 Vdc represents 5.0 Vdc)	TP23	2.50 VDC COMPARATOR REFERENCE VOLTAGE
TP6	+15VSCALED (+4.0 Vdc represents 15.0 Vdc)	TP24	5.0 VDC INTERNAL CONTROL VOLTAGE
TP7	PRN_CLK\ (Label Printer module's stepper motor clock)	TP25	INVERTED -15V (supply)
TP8	POWER_FAIL\ (HIGH signal = good; logic LOW signal = power failed)	TP26	When present System Control card may disable +24 V supply to SlideMaker.
TP9	INHIBIT_PWR\ (LOW signal = power inhibit)	TP27	When present System Control card may disable +24 V supply to SlideMaker.
TP10	+24VSCALED (+4.0 Vdc represents 24.0 Vdc)	TP28	INVERTED -15 VDC (+4 Vdc represents -15 Vdc)
TP11	5PSI pneumatic monitor (+5 Vdc represents 35.0 psi)	TP30	+15VDC
TP12	30PSI pneumatic monitor (+5 Vdc represents 35.0 psi)	TP31	-15VDC
TP13	HIGH_VAC (RAW_VAC) pneumatic monitor (+5.0 Vdc represents 32" Hg)	TP32	+24VDC (through 1K resistor)
TP14	LOW_VAC1 (REG_VAC1) pneumatic monitor (+5 Vdc represents 20" Hg)	TP33	-15VDC (through 1K resistor)
TP15	Spare #1 analog channel (ACH_B17)	TP34	+5VDC (through 1K resistor)
TP17	LOW_VAC2 (REG_VAC2) pneumatic monitor (+5.0 Vdc represents 8.0" Hg)	TP35	+15VDC (through 1K resistor)
TP18	Spare #2 analog channel (ACH_B18)	TP36	GROUND
TP20	5VBAD\ (LOW = bad)		

Slide Ejector Interface Card

Figure A.2-5 Slide Ejector Interface Card Components



Connectors

Table A.2-11 Slide Ejector Interface Card Connectors

J No.	Connects to:	J No.	Connects to:
J1	Output cassette retracted sensor, SEN15	J12	Reserved for cassette lifted sensor, SEN29
J2	Output cassette extended sensor, SEN16	J13	Spare sensor, SEN50
J3	Cassette locked sensor, SEN21	J14	Cassette lock solenoid, SOL47
J4	Cassette unlocked sensor, SEN22	J15	Registered Z release solenoid, SOL48
J5	Slide pusher retracted sensor, SEN23	J16	Registered X release solenoid, SOL49
J6	Slide pusher extended sensor, SEN24	J17	Input cassette transfer solenoid, SOL50
J7	Slide registered sensor, SEN25	J18	Output cassette transfer solenoid, SOL53
J8	Cassette present sensor, SEN26	J19	Cassette lift solenoid, SOL55
J9	Main Distribution card, J9	J20	Register X (cleared) sensor, SEN17
J10	Input cassette retracted sensor, SEN27	J21	Register Z forward sensor, SEN20
J11	Cassette Empty Sensor card, SEN28	J22	Spare sensor, SEN14

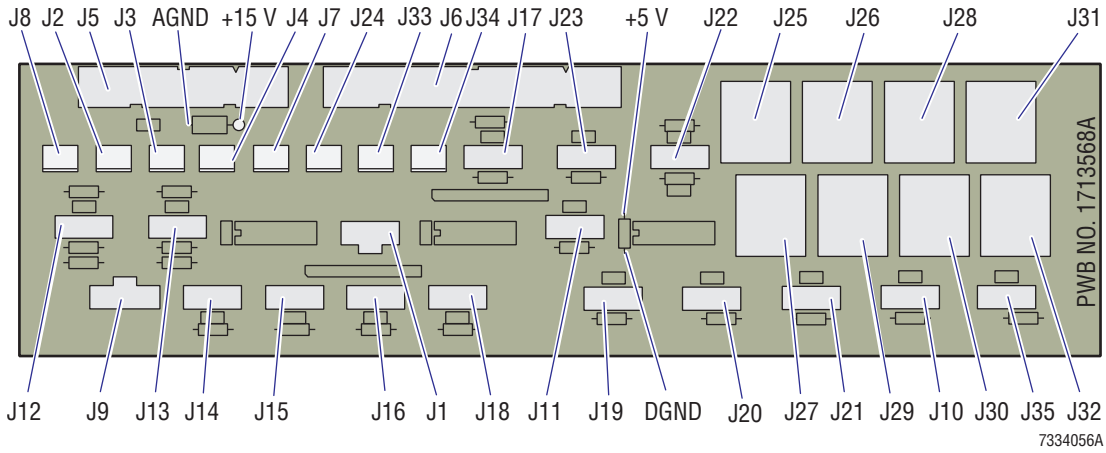
Test Points

Table A.2-12 Slide Ejector Interface Card Test Points

TP	Signal Name	TP	Signal Name
HGND	High noise ground	+5V	Power supply voltage
+24V	Power supply voltage	DGND	Digital ground

Smear/Transport Interface Card

Figure A.2-6 Smear/Transport Interface Card Components



Connectors

Table A.2-13 Smear/Transport Interface Card Connectors

J No.	Connects to:	J No.	Connects to:
J1	Shuttle stepper motor, M1	J18	Slide transfer retracted sensor, SEN9
J2	Probe down solenoid, SOL42	J19	Slide transfer extended sensor, SEN10
J3	Slide transfer solenoid, SOL41	J20	Probe up sensor, SEN11
J4	Truck vacuum solenoid, SOL43	J21	Probe down sensor, SEN12
J5	System Control card, J5 (fluid-detector signals)	J22	Truck lift up sensor, SEN18 Truck lift down sensor, SEN19
J6	Main Distribution card, J6	J23	Cassette transit sensor, SEN30
J7	Shuttle vacuum solenoid, SOL44	J24	Upper cassette transfer solenoid, SOL45
J8	Printhead release solenoid, SOL46	J25	FD1 (near needle in GEN•S System Diluter)
J9	Encoder A sensor, SEN58; Encoder B sensor, SEN59; Encoder I sensor, SEN60	J26	FD2 (in Sample Access and Reservoir module)
J10	Servo reverse limit sensor, SEN1	J27	FD3 (in Dispense module)
J11	Servo forward limit sensor, SEN2	J28	FD4 (in Sample Access and Reservoir module)
J12	Truck vacuum sensor, SEN3	J29	FD5 (in Dispense module)
J13	Shuttle vacuum sensor, SEN4	J30	FD6 (in Dispense module)
J14	Print position sensor, SEN5	J31	FD7 (in Sample Access and Reservoir module)
J15	Smear position sensor, SEN6	J32	FD8 (in Dispense module)
J16	Dispense position sensor, SEN7	J33	Truck lift solenoid, SOL56
J17	Cassette transfer home sensor, SEN8	J34	Spare solenoid, SOL57

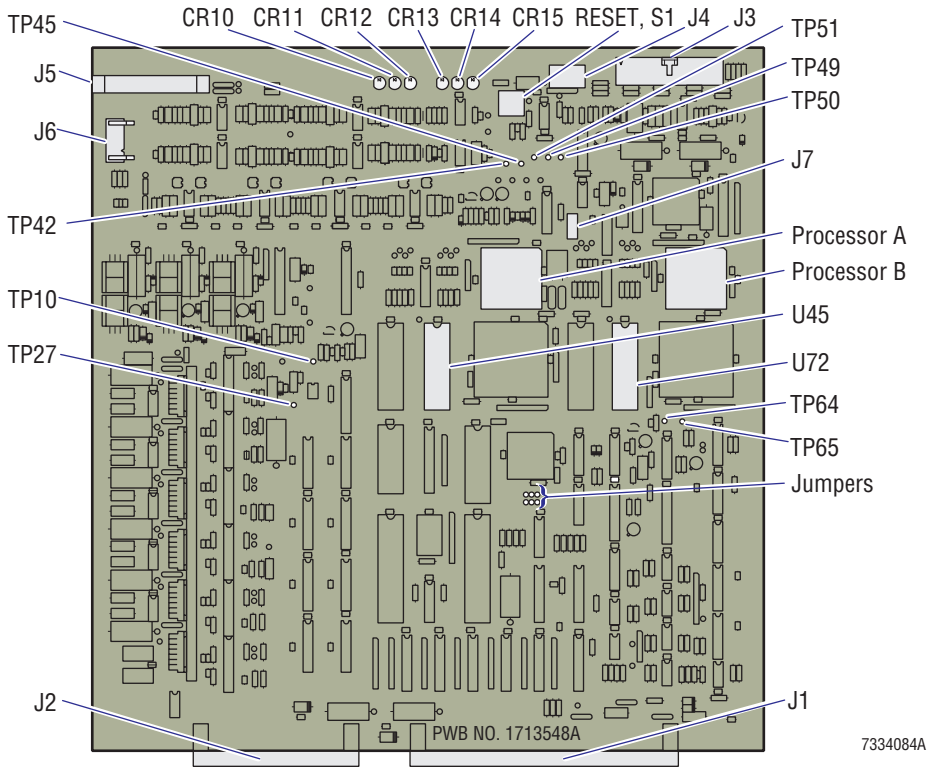
Test Points

Table A.2-14 Smear/Transport Interface Card Test Points

TP	Signal Name	TP	Signal Name
AGND	Analog ground	+5V	Power supply voltage
+15V	Power supply voltage	DGND	Digital ground

System Control Card

Figure A.2-7 System Control Card Components



Connectors

Table A.2-15 System Control Card Connectors

J No.	Connects to:	J No.	Connects to:
J1	Main Distribution card, P1	J5	Smear/Transport Interface card, J5 (fluid-detector signals)
J2	Main Distribution card, P2	J6	Servo motor, M7
J3	LCD	J7	Not connected. Used with jumpers for normal operation.
J4	Keypad		

Jumpers

On J7, jumper 2-4 and 7-8 for normal operation.

On E1 through E6, jumper:

- E3-E5 and E4-E6 for normal operation.
- E1-E3 and E2-E4 to download software using the laptop computer.

LEDs

Table A.2-16 System Control Card LEDs

LED No.	LED Name	In the Boot mode, all LEDs are lit and then:	In the Normal mode:
		Processor "A" Checks*	
CR10	STATA2	Goes out when the DUART port check passes.	Not lit
CR11	STATA1	Goes out when the RAM test passes.	Not lit or lit.†
CR12	STATA0	Goes out when the CPU A register test passes.	Blinks, indicating Processor "B" is being checked for pneumatic and power supply readings.
		Processor "B" Checks*	
CR13	STATB2	Not used. Goes out after the RAM and CPU B register tests pass.	Not lit.
CR14	STATB1	Goes out when the RAM test passes.	Blinks, indicating Processor "B" is being checked for pneumatic and power supply readings.
CR15	STATB0	Goes out when the CPU B register test passes.	Not lit.

* If any test for this processor fails, all three of its LEDs are relit.
† This LED is used during testing. Its state is not significant during normal day-to-day operations.

Test Points

Table A.2-17 System control Card Test Points

TP	Signal Name	TP	Signal Name
TP10	+24 V	TP49	+15 V
TP27	+5.6 V reference (stepper motor driver reference)	TP50	Analog ground
TP42	+5 V	TP51	-15 V
TP45	Digital ground		

A.3 SOLENOID FUNCTIONS

Solenoids in the SlideMaker and the Sample Access and Reservoir module in the Diluter are energized or de-energized to perform a SlideMaker function or to activate other components to perform the function. Table A.3-1 lists each of these solenoids, in numerical order, and includes the name of the solenoid, the components the solenoid activates, and the functions of the components. Notice that valves are always assigned the same number as the solenoid used to activate them.

Use the figures referenced in Table A.3-1 to locate the solenoids and the components activated by the solenoids.

To test a solenoid, use the Solenoid Test screen (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ SOLENOID TEST**). For details about the Solenoid Test screen, refer to Table 4.2-1.

CAUTION Risk of damage to driver circuitry. Connecting or disconnecting a solenoid while the power is ON can damage the driver circuitry. Power down the SlideMaker before connecting or disconnecting a solenoid.

If you need to disconnect the solenoid to check it further, or to replace it, always power down the SlideMaker first.

Note: Early SlideMakers have black bodied solenoids which **WILL** damage the solenoid drivers on the System Control card if they are disconnected with the SlideMaker power on.

Table A.3-1 Solenoid Functions

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
1	Res1 1st Tee Isol See Figure 2.5-2	VL1 See Figure 2.5-1	Closes line on first T-fitting in RES1 (FT4, port 1).
2	Res2 1st Tee Isol See Figure 2.5-2	VL2 See Figure 2.5-1	Closes line on first T-fitting in RES2 (FT3, port 1).
3	Res1 Isol See Figure 2.5-2	VL3A See Figure 2.5-1 VL3B See Figure 2.5-2	Closes blood transport line to isolate sample in RES1.
4	Res2 Isol See Figure 2.5-2	VL4A See Figure 2.5-1 VL4B See Figure 2.5-2	Closes blood transport line to isolate sample in RES2.
5	Bwsh #1 See Figure 2.5-2	VL5 See Figure 2.5-1	Provides pressurized (30 psi) diluent to rinse the aspiration and reservoir lines.
6	Res1 2nd Tee Isol See Figure 2.5-2	VL6 See Figure 2.5-2	Closes line on second T-fitting in RES1 (FT8, port 1).
7	Res2 2nd Tee Isol See Figure 2.5-2	VL7 See Figure 2.5-2	Closes line on second T-fitting in RES2 (FT9, port 1).

Table A.3-1 Solenoid Functions *(Continued)*

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
8	Primed Sample Isol See Figure 2.5-2	VL8 See Figure 2.5-2	Closes dispense line to isolate sample after priming.
9	Dispense pump #1 See Figure 2.5-2	DP1 See Figure 2.5-2	Dispenses a 4.0 µL blood drop for single-slide mode and first slide in dual-slide mode.
10	Dispense pump #2 See Figure 2.5-2	DP2 on original SlideMakers See Figure 2.5-2	Dispenses a 4.0 µL blood drop for second slide in dual-slide mode.
		VL10 on current SlideMakers See Figure 2.5-2	Closes pressure line from SOL22. Acts as a fail-safe if SOL22 fails in the open position.
11	N/A - spare	Unassigned	N/A
12	N/A - spare	Unassigned	N/A
13	N/A - spare	Unassigned	N/A
14	RVAC #2 See Figure 2.5-2	VL14 See Figure 2.5-2	Provides 6.5 in. Hg/17.5 in. Hg vacuum to second T-fitting in reservoirs (FT8 and FT9).
15	Vent #2 See Figure 2.5-2	VL15 See Figure 2.5-2	Provides vent (atmospheric pressure) to second T-fitting in reservoirs (FT8 and FT9).
16	Vent #1 See Figure 2.5-2	VL16 See Figure 2.5-2	Provides vent (atmospheric pressure) to first T-fitting in reservoirs (FT4 and FT3).
17	RVAC #1 See Figure 2.5-2	VL17 See Figure 2.5-2	Provides 6.5 in. Hg/17.5 in. Hg vacuum to first T-fitting in reservoirs (FT4 and FT3).
18	5 PSI Prime Pressure See Figure 2.5-2	VL18 See Figure 2.5-2	Provides 5 psi to push sample from reservoir to dispense line.
19	Backwash Probe See Figure 2.5-2	VL19 See Figure 2.5-2	Provides pressurized (30 psi) diluent at the rinse block to rinse the dispense probe.
20	Backwash #2 See Figure 2.5-2	VL20 See Figure 2.5-2	Provides pressurized (30 psi) diluent to rinse the reservoirs and dispense lines.
21	30 PSI #1 See Figure 2.5-2	None	Solenoid provides 30 psi to first T-fitting in reservoirs (FT4 and FT3) to dry aspiration and reservoir lines.
22	30 psi #2 See Figure 2.5-2	None	Solenoid provides 30 psi to second T-fitting in reservoirs (FT8 and FT9) to dry reservoir and dispense lines.
23	Vacuum Accum. Rinse See Figure 2.3-1	VL23 See Figure 2.3-2	Rinses vacuum accumulator tank, TK3.
24	Res SW2 (RES1 normally open) See Figure 2.5-2	None	Solenoid switches sample dispense path from RES1 to RES2.
25	N/A - spare	Unassigned	N/A
26	N/A - spare	Unassigned	N/A

Table A.3-1 Solenoid Functions *(Continued)*

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
27	Backwash pressure See Figure 2.3-3	VL27 See Figure 2.3-2	Provides 30 psi to the reagent tank, TK1, to backwash the sample lines.
28	Diluent Refill See Figure 2.3-3	VL28A See Figure 2.3-2 VL28B See Figure 2.3-2	Refills reagent tank, TK1, with diluent. • VL28A provides vacuum to the reagent tank to pull in the reagent. • VL28B routes diluent to the reagent tank.
29	Cleaning Agent Input See Figure 2.3-3	VL29 See Figure 2.3-2	Switches input to reagent tank, TK1, from diluent to cleaning agent. The diluent line is normally open. **Note**: SOL28 is energized with SOL29, to apply vacuum, via VL28B, to the reagent tank.
30	Bleach Input See Figure 2.3-3	VL30 See Figure 2.3-2	Switches input to reagent tank, TK1, from cleaning agent to bleach. **Note**: SOL28 is energized with SOL30, to apply vacuum, via VL28B, to the reagent tank.
31	Waste Chamber Vacuum See Figure 2.3-3	VL31 See Figure 2.3-2	Provides high vacuum to the waste chamber.
32	RVAC Switch See Figure 2.3-3	VL32 See Figure 2.3-2	Switches regulated vacuum from 17.5 in. Hg to 6.5 in. Hg.
33	Rinse Block Drain See Figure 2.3-3	VL33 See Figure 2.3-2	Opens pathway for draining the rinse block to the main waste chamber.
34	Low Vac/Vent Chamber Drain See Figure 2.3-3	VL34A See Figure 2.3-2 VL34B See Figure 2.3-2	Drains low vacuum and vent chambers to the main waste chamber. **Note**: The high vacuum input to REG1 is routed through VL34B.
35	Dry Probe See Figure 2.3-3	VL35 See Figure 2.3-2	Opens pathway for vacuum from the waste chamber to dry the dispense probe.
36	Waste Chamber Drain See Figure 2.3-3	VL36A See Figure 2.3-2 VL36B See Figure 2.3-2	Drains waste chamber to Analytical Station's waste container using 5 psi.
37	See SOL114.	See SOL114	See SOL114.
38	See SOL115	See SOL115	See SOL115.
39	See SOL116	See SOL116	See SOL116.
40	See SOL117	See SOL117	See SOL117.

Table A.3-1 Solenoid Functions *(Continued)*

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
41	Slide Transfer See Figure 2.7-1	CL8 See Figure 2.7-1	Transfers the slide from the shuttle bed to the Dryer module.
42	Probe Down See Figure 2.5-15	CL10 See Figure 2.5-15	Moves the dispense probe down into the rinse block.
43	Truck Vacuum See Figure 2.7-1	VL43 See Figure 2.7-1	Routes high vacuum from VC6 to the smear truck to hold the slide.
44	Shuttle Vacuum See Figure 2.7-1	VL44 See Figure 2.7-1	Routes high vacuum from VC5 to the shuttle bed to hold the slide.
45	Upper Cassette Transfer See Figure 2.6-5	CL9 See Figure 2.6-5	Moves the slide cassette from slide ejector station to Cassette Output Queue module.
46	Print Head Lock See Figure 2.8-2	CL4 See Figure 2.8-1	Locks the printhead to apply pressure to label dispenser roll.
47	Cassette Lock See Figure 2.6-1 or Figure 2.6-3	CL5 See Figure 2.6-2	Locks the slide cassette.
48	Register Z Rel Solenoid See Figure 2.6-1 or Figure 2.6-3	CL3 See Figure 2.6-2	Aligns the ejected slide along the Z-axis, the axis from the front to the back of the SlideMaker.
49	Register X Rel Solenoid See Figure 2.6-1 or Figure 2.6-3	CL11 See Figure 2.6-2	Aligns the ejected slide along the X-axis, the axis from the left to the right of the SlideMaker.
50	Input Cassette Transfer See Figure 2.6-1 or Figure 2.6-3	CL6 See Figure 2.6-2	Advances the slide cassettes in the Cassette Input Queue module to the slide ejector station.
51	N/A - spare	Unassigned	N/A
52	See SOL119	See SOL119	See SOL119.
53	Output Cassette Transfer See Figure 2.6-6	CL7 See Figure 2.6-6	Advances the slide cassettes in the Cassette Output Queue module to the operator retrieval position.
54	N/A -spare	Unassigned	N/A
55	Cass Lift Solenoid See Figure 2.6-1 or Figure 2.6-3	CL14 See Figure 2.6-1	Lifts the slide cassette from the ejection position for transfer to the Cassette Output Queue.
56	Truck Lift Release See Figure 2.7-1	CL12 See Figure 2.7-6	When de-energized, holds the smear truck in the raised, horizontal position; when energized, releases the truck lift, tilting the smear truck. **Note**: Works in conjunction with SOL61.

Table A.3-1 Solenoid Functions *(Continued)*

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
57	Right Xover Cylinder See Figure 2.11-1	CL2 See Figure 2.11-1	Moves the slide baskets from the input (rear) track to the output (front) track.
58	Left Xover Cylinder See Figure 2.11-1	CL1 See Figure 2.11-1	Moves the slide baskets from the output (front) track to the input (rear) track.
59	N/A - spare	Unassigned	N/A
60	Gripper Rel Solenoid See Figure 2.10-1	Gripper See Figure 2.10-2	Activates gripper on platen to hold slide when transferring slide to basket.
61	Truck Tilt/DWN See Figure 2.7-1	CL12 See Figure 2.7-6	Lowers the smear truck to the shuttle position. **Note**: Works in conjunction with SOL56.
62	N/A - spare	Unassigned	N/A
63	Vac Accum Drain See Figure 2.3-1	None	Solenoid drains the vacuum accumulator, TK3, to the Analytical Station's waste container.
64	See SOL118	See SOL118	See SOL118.
65	30 psi enable See Figure 2.3-1	None	Controls the acquisition of 30 psi from the Analytical Station.
66	High vacuum enable See Figure 2.3-1	None	Controls the acquisition of high vacuum from the Analytical Station.
114	SlideMaker Ndl Ventside Isol See Figure 2.5-1	VL114 See Figure 2.5-1	Isolates Analytical Station's needle vent side. **Note**: To test SOL114, use the F05 function on the Diluter/numeric keypad.
115	SlideMaker Ndl Vent Cham Isol 1 See Figure 2.5-1	VL115 See Figure 2.5-1	Closes pathway to Analytical Stations's vent chamber, VC19, and to diluent supply. **Note**: To test SOL115, use the F05 function on the Diluter/numeric keypad.
116	SlideMaker Ndl Vent Cham Isol 2 See Figure 2.5-1	VL116 See Figure 3.3-13	Closes pathway to Analytical Station's vent chamber, VC19. **Note**: To test SOL116, use the F05 function on the Diluter/numeric keypad.
117	1st Aspiratation Line Isol See Figure 2.5-1	VL117 See Figure 2.5-1	Closes SlideMaker aspiration line. **Note**: To test SOL117, use the F05 function on the Diluter/numeric keypad.
118	Reservoir SW1 (RES1 normally open) See Figure 2.5-1	None	Solenoid switches sample aspiration pathway from RES1 to RES2. **Note**: To test SOL118, use the F05 function on the Diluter/numeric keypad.

Table A.3-1 Solenoid Functions *(Continued)*

SOL No.	Solenoid Name/ Location Reference	Components Activated/ Location Reference	Components' Function
119	N/A - spare	Unassigned	N/A
120	2nd Aspiration Line Isol See Figure 2.5-1	VL120 See Figure 2.5-1	Closes SlideMaker aspiration line. VL120 is a fail-safe for VL117, in case the driver for SOL117 fails. VL120 is in line with VL117 and opens and closes at the same time as VL117. **Note**: To test SOL120, use the F05 function on the Diluter/numeric keypad.

A.4 SENSOR FUNCTIONS AND TYPES

Sensor Table

The SlideMaker uses over 60 sensors to monitor its functions. Table A.4-1 lists the number and electrical mnemonic of each sensor (in numeric order), the type of sensor used and its active state, the interface card the sensor is connected to, and the location of its output signal from that interface card.

For more information about the types of sensors used in the SlideMaker and their current and voltage requirements, see Types and Requirements of Sensors Used at the end of this section.

The active state of a sensor is the state when the sensor is performing its intended function. The active state is indicated by an asterisk on the Sensor Status screen (**MAIN MENU ▸▸ SPECIAL FUNCTIONS ▸▸ SENSOR STATUS**) or (**MAIN MENU ▸▸ SERVICE FUNCTIONS ▸▸ RUN SERVICE ▸▸ SCAN SENSOR TEST**).

Table A.4-1 Sensor Functions

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
1	SERVO REVERSE LIMIT See Figure 2.7-1	Infrared interrupting Blocked = truck at reverse limit	Smear/Transport Interface	J10	J6, 7
2	SERVO FORWARD LIMIT See Figure 2.7-1	Infrared interrupting Blocked = truck at forward limit	Smear/Transport Interface	J11	J6, 8
3	TRUCK VACUUM See Figure 2.7-1	Vacuum-activated switch Closed = vacuum present	Smear/Transport Interface	J12	J6, 9
4	SHUTTLE VACUUM See Figure 2.7-1	Vacuum-activated switch Closed = vacuum present	Smear/Transport Interface	J13	J6, 10
5	PRINT POSITION See Figure 2.7-1	Infrared interrupting Blocked = shuttle at printer position	Smear/Transport Interface	J14	J6, 11
6	SMEAR POSITION See Figure 2.7-1	Infrared interrupting Blocked = shuttle at smear position	Smear/Transport Interface	J15	J6, 12
7	DISPENSE POSITION See Figure 2.7-1	Infrared interrupting Blocked = shuttle at dispense position	Smear/Transport Interface	J16	J6, 13
8	CASSETTE XFER HOME See Figure 2.6-5	Infrared interrupting Blocked = Upper cassette transfer mechanism at home position. For details, see Table A.4-2.	Smear/Transport Interface	J17	J6, 14
9	SLIDE XFER RETR See Figure 2.7-1	Infrared interrupting Blocked = slide transfer mechanism retracted	Smear/Transport Interface	J18	J6, 15

Table A.4-1 Sensor Functions *(Continued)*

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
10	SLIDE XFER EXTD See Figure 2.7-1	Infrared interrupting Blocked = slide transfer mechanism extended	Smear/Transport Interface	J19	J6, 16
11	PROBE UP See Figure 2.5-15	Infrared interrupting Blocked = probe up	Smear/Transport Interface	J20	J6, 17
12	PROBE DOWN See Figure 2.5-15	Infrared interrupting Blocked = probe down	Smear/Transport Interface	J21	J6, 18
13	RESET	Manually activated switch Closed =initiates software controlled reset (closed momentarily, open normally)	Main Distribution	J14	N/A
14	Spare interlock	N/A	Slide Ejector Interface	J22	J9, 1
15	OUTPUT CASS RETR See Figure 2.6-6	Infrared interrupting Blocked = output cassette transfer mechanism retracted (cassette in home or rest position)	Slide Ejector Interface	J1	J9, 5
16	OUTPUT CASS EXTD See Figure 2.6-6	Infrared interrupting Blocked = output cassette transfer mechanism extended (cassette fully pushed to output position)	Slide Ejector Interface	J2	J9, 6
17	REGISTER X (cleard) See Figure 2.6-1 or Figure 2.6-3	Infrared interrupting Blocked = register X arm fully cleared the truck path	Slide Ejector Interface	J20	J9, 17
18	TRUCK LIFT UP See Figure 2.7-6 or Figure 2.7-7	Magnetic switch Closed = truck lift up	Smear/Transport Interface	J22	J6,3
19	TRUCK LIFT DOWN See Figure 2.7-6 or Figure 2.7-7	Magnetic switch Closed = truck lift down	Smear/Transport Interface	J22	J6, 5
20	REGISTER Z FORWARD See Figure 2.6-1 or Figure 2.6-3	Infrared interrupting Blocked = register Z arm is fully forward (no slide is available for pickup)	Slide Ejector Interface	J21	J9, 4
21	CASS LOCKED See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = cassette locked	Slide Ejector Interface	J3	J9, 7

Table A.4-1 Sensor Functions *(Continued)*

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
22	CASS UNLOCKED See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = cassette unlocked	Slide Ejector Interface	J4	J9, 8
23	SLIDE PUSHER RETR See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = slide ejector retracted	Slide Ejector Interface	J5	J9, 9
24	SLIDE PUSHER EXTD See Figure 2.6-2 or Figure 2.6-4	Infrared interrupting Blocked = slide ejector extended (slide has been ejected)	Slide Ejector Interface	J6	J9, 10
25	SLIDE REGISTERED See Figure 2.6-2 or Figure 2.6-3	Infrared interrupting Blocked = left side of slide registered correctly	Slide Ejector Interface	J7	J9, 11
26	CASS PRESENT See Figure 2.6-2 or Figure 2.6-4	Reflective infrared Reflection = slide cassette present in ejection position	Slide Ejector Interface	J8	J9, 12
27	INPUT CASS RETR See Figure 2.6-2 or Figure 2.6-4	Reflective infrared Reflection = input cassette transfer mechanism in home position	Slide Ejector Interface	J10	J9, 13
28	CASS EMPTY See Figure 2.6-2 or Figure 2.6-4	Reflective infrared (mounted on PCB) Reflection = slide cassette present and empty	Slide Ejector Interface	J11	J9, 14
29	CASS LIFTED (reserved)	N/A	Slide Ejector Interface	J12	J9, 15
30	CASS TRANSIT See Figure 2.6-5	Infrared interrupting Blocked = upper cassette transfer mechanism in transit between home and fully extended. For details, see Table A.4-2.	Smear/Transport Interface	J23	J6, 6
31	REAR BELT POS See Figure 2.11-1	Infrared interrupting, 4 piece (mounted on PCB) Blocked = rear belt profile in center of sensor	Basket Transport Interface	J1	J7, 7
32	FRONT BELT POS See Figure 2.11-1	Infrared interrupting, 4 piece (mounted on PCB) Blocked = front belt profile in center of sensor	Basket Transport Interface	J2	J7, 8

Table A.4-1 Sensor Functions *(Continued)*

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
33	BASKET PRESENT REAR RIGHT See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked = basket present at right rear position	Basket Transport Interface	J3	J7, 9
34	BASKET PRESENT FRONT RIGHT See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked = basket present at right front position	Basket Transport Interface	J4	J7, 10
35	BASKET PRESENT REAR LEFT See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked = basket present at left rear position	Basket Transport Interface	J5	J7, 11
36	BASKET PRESENT FRONT LEFT See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked = basket present at left front position	Basket Transport Interface	J6	J7, 12
37	BASKET INDEX See Figure 2.11-1	Infrared interrupting, 2 piece (mounted on PCB) Blocked (blocked < 2.1 V, unblocked >3.4 V) = slide insertion space occupied (Slide is in the basket at this position, or the basket is not in position to receive a slide.)	Basket Transport Interface	J8	J7, 13
38	Spare	N/A	Smear/Transport Interface	J35	J6, 1
			Basket Transport Interface	J9	J7, 14
39	LEFT XOVER HOME See Figure 2.11-1	Infrared interrupting Not blocked = left crossover cylinder at home position	Basket Transport Interface	J10	J7, 15
40	RIGHT XOVER HOME See Figure 2.11-1	Infrared interrupting Not blocked = right crossover cylinder at home position	Basket Transport Interface	J11	J7, 16
41	VERTICAL SLIDE See Figure 2.10-1	Reflective infrared Reflection = slide present in drop position of basket	Dryer Interface	J5	J8, 5
42	Spare	N/A	Dryer Interface	J4	J8, 6
43	Spare	N/A	Dryer Interface	J15	J8, 7

Table A.4-1 Sensor Functions *(Continued)*

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
44	PLATEN ELEV UP See Figure 2.10-1	Infrared interrupting Blocked = elevator is up, platen is horizontal	Dryer Interface	J11	J8, 8
45	PLATEN ELEV DOWN See Figure 2.10-1	Infrared interrupting Blocked = elevator is down, platen is vertical	Dryer Interface	J10	J8, 9
46	GRIPPER OVEREXTENDED See Figure 2.10-2	Infrared interrupting Blocked = gripper fully closed indicating either no slide at platen or slide improperly placed at platen	Dryer Interface	J9	J8, 10
47	REAGENT FULL See Figure 2.3-2	Magnetic reed switch Open = reagent tank full	Main Fluidics Interface	J3	J12, 13
48	Spare	N/A	Main Fluidics Interface	J4	J12, 14
49	DRYER EXIT See Figure 2.9-1	Pulsed infrared reflective (mounted on PCB) Reflection = slide present at exit position of Dryer module	Dryer Interface	J3	J8, 11
50	Spare	N/A	Slide Ejector Interface	J13	J9, 16
51	VACUUM RESERVOIR FULL See Figure 2.3-1	Magnetic reed switch Closed = vacuum chamber full of liquid	Main Distribution	J18	N/A
52	Spare	N/A	Main Distribution	J22	J6, 6
53	MAIN COVER INTERLOCK	Magnetic reed switch Open = main cover open	Main Distribution	J16	N/A
54	BASKET COVER INTERLOCK	Magnetic reed switch Open = basket cover open	Basket Transport Interface	J14	J7, 5
55	Spare	N/A	Basket Transport Interface	J15	J7, 6
56	Spare	N/A	Main Distribution	J20	N/A
57	Spare	N/A	Main Distribution	J21	N/A
58	ENCODER A ENCIN58 See Figure 2.7-1	Encoder Phase A of quadrature encoder	Smear/Transport Interface	J9	J6, 19
59	ENCODER B ENCIN59 See Figure 2.7-1	Encoder Phase B of quadrature encoder	Smear/Transport Interface	J9	J6, 20
60	ENCODER I ENCIN60 See Figure 2.7-1	Encoder Index position of quadrature encoder	Smear/Transport Interface	J9	J6, 21

Table A.4-1 Sensor Functions *(Continued)*

SEN No.	Electrical Mnemonic/ Location Reference	Type/ Active State	Interface Card	Input Connector	Output Plug, Pin
61	Printer direction	Logic Not used			
62	Serial 1 cts	Logic N/A			
63	Serial 2 cts	Logic N/A			
	Temperature Sensor card See Figure 2.9-1	Temperature (mounted on PCB)			

Table A.4-2 SEN8 (CASSETTE XFER HOME) and SEN30 (CASS TRANSIT) Functionality

SEN8	SEN30	Functional Meaning
0	0	Upper cassette transfer mechanism is fully extended.
0	1	Upper cassette transfer mechanism is in transit.
1	0	Upper cassette transfer mechanism is in home position.
1	1	Upper cassette transfer mechanism is in transit.

Types and Requirements of Sensors Used

This section gives the general functions, and where applicable, the voltage and current requirements of the types of sensors used in the SlideMaker.

Encoder Sensors

The encoder sensors are part of a rotary quadrature encoder used to monitor the revolutions of the servo motor, allowing the SlideMaker to calculate precise information on the position of the smear truck. Two of the encoder sensors, SEN58 and SEN59, are used to count the slots on the encoder disk. The third encoder sensor, SEN60, indicates the zero index position of the disk.

As the encoder disk rotates, one of the two quadrature signals leads the other. The direction of rotation, clockwise or counterclockwise, is determined from which of the signals is leading.

The rotational position is determined by counting the number of steps from the last known zero index position. The zero index position sensor is only observed once, during initialization of the smear truck transport. Thereafter the quadrature signals are counted to determine the position of the smear truck relative to the saved zero index position.

Infrared Interrupting Sensors

Infrared interrupting sensors are used to detect the presence of a flag, which determines the position of a movable mechanism. The voltage and current requirements for the infrared interrupting sensors are:

- CC standard 0.200 in. gap-interrupting sensors
  - LED anode supplied by 150 ohm ±5%, 1/4 W resistor to +5 V, cathode to ground
  - Phototransistor emitter supplied by 10 Kohm ±5%, 1/4 W resistor to ground, collector to +5 V.
- Coulter assembled (2 piece) large gap-interrupting sensors
  - LED anode supplied by 150 ohm ±5%, 1/4 W resistor to +5 V, cathode to ground
  - Phototransistor emitter supplied by 39 Kohm ±5%, 1/4 W resistor to ground, collector to +5 V.
- Coulter assembled (4 piece) large gap-interrupting sensors
  - LED anodes (47 ohms in series with each anode) supplied by 47 ohm ±5%, 1/4 W resistor to +5 V, cathodes to ground.
  - Phototransistor emitters supplied by one 47 Kohm ±5%, 1/4 W resistor to ground, collectors to +5 V.

Logic Sensors

The logic sensors are software monitors, not physical sensors. The serial 1 cts (clear to send) and serial 2 cts sensors monitor handshake signal from the Workstation and the service port.

Magnetic Reed Switch Sensors

Magnetic reed switch sensors are used:

- With magnetic floats in the reagent reservoirs to sense reagent levels.
- To sense the position of the smear truck lift.
- To sense the interlock conditions of the outer SlideMaker covers.

These switches have minimum current requirements to guarantee contact cleaning.

The voltage and current requirements for the float sensors are:

- Switch armature connected with current limit to +5 V.
- Normally CLOSED (when not full) contact supplied by 10 Kohm ±5%, 1/4 W resistor to ground.

The voltage and current requirements for the interlock switches are:

- Switch armature connected with current limit to +5 V.
- Normally CLOSED (when door closed) contact supplied by 10 Kohm ±5%, 1/4 W resistor to ground.

Manually Activated Switch Sensors

A manually activated switch sensor is used to stop the SlideMaker. The voltage and current requirements for the manually-activated switch sensor are:

- Switch armature connected with current limit to +5 V.
- Normally OPEN contact supplied by 10 Kohm ±5%, 1/4 W resistor to ground.

Pulsed Infrared Reflective Sensors

Pulsed infrared reflective sensors are used to detect glass surfaces where high sensitivity and/or immunity to ambient light is required. The voltage and current requirements for the Coulter-assembled pulsed infrared reflective sensors are:

- LED supplied by +5 V, cathode to sensor IC.
- Sensor IC supplied by +5 V, output supplied by 10 Kohm ±5%, 1/4 W resistor to +5 V, IC common to ground.

Reflective Infrared Sensors

Reflective infrared sensors are used to detect a reflective surface on objects moved within the SlideMaker. The voltage and current requirements for the reflective infrared sensors are:

- CC standard “arrowhead” 0.38 cm (0.15 in.) target reflective sensors
  - LED anode supplied by 150 ohm ±5%, 1/4 W resistor to +5 V, cathode to ground.
  - Phototransistor emitter supplied by 39 Kohm ±5%, 1/4 W resistor to ground, collector to +5 V.
- CC standard “sidelooker” 0.38 cm (0.15 in.) target reflective sensors
  - LED anode supplied by 150 ohm ±5%, 1/4 W resistor to +5 V, cathode to ground.
  - Phototransistor emitter supplied by 39 Kohm ±5%, 1/4 W resistor to ground, collector to +5 V.

Temperature Sensor

A temperature sensor is used to measure the air temperature in the slide path in the Dryer module. The voltage and current requirements for the temperature sensor are:

- The Temperature Sensor Integrated circuit power input is through a 1 Kohm ±5%, 1/4 W resistor on the Temperature Sensor card from +15 V, with a common lead to analog ground.
- The output is 10 mV/°C.

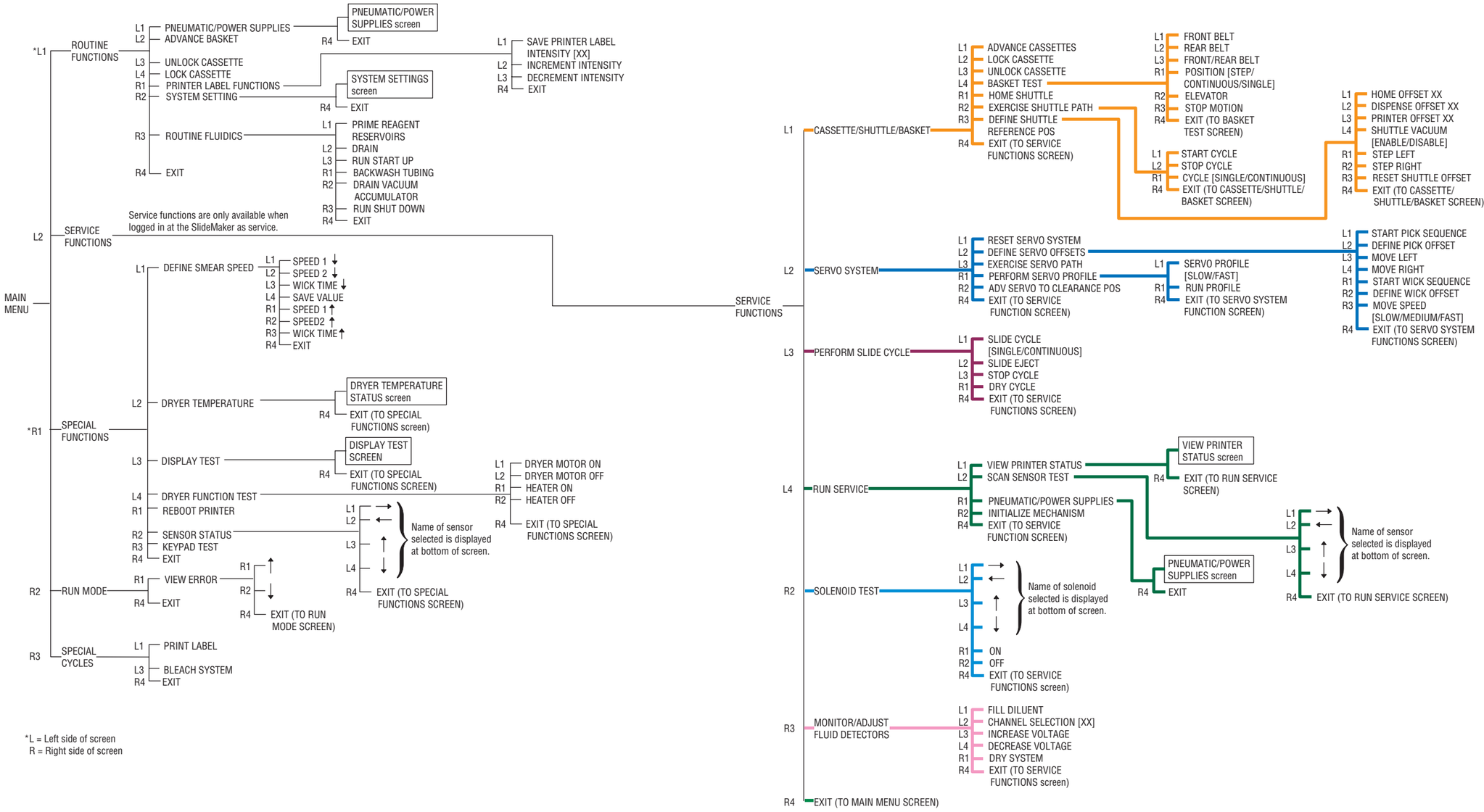
Vacuum-Activated Switch Sensors

Vacuum-activated switch sensors are used to detect vacuum in the pneumatic lines to the truck and shuttle. The voltage and current requirements for the vacuum-activated switch sensors are:

- Switch armature connected with current limit to +5 V.
- Normally OPEN contact supplied by 10 Kohm ±5%, 1/4 W resistor to ground with capacitor to increase closing current.

A.5 MENU TREE

Figure A.5-1 SlideMaker Menu Summary



*L = Left side of screen
R = Right side of screen

A.5-2

B.1 VLS FUNCTION, CALIBRATION, AND TROUBLESHOOTING

Function

On GEN•S or LH 750 Systems with a SlideMaker, the needle-vent line for the Analytical Station is also the aspiration line for the SlideMaker. The vent-line sensing (VLS) function is used when the Analytical Station is operating in the Automatic mode to confirm the needle-vent/aspiration line is rinsed and dried correctly at the end of each cycle.

Note: The VLS function is only available on GEN•S and LH 750 Systems with a SlideMaker attached. It is enabled by setting the DILUTER PROCESSOR card (or DILUTER CPU card) switch, SW1, position 7, to ON. Once it is enabled, it is used whether the SlideMaker is on or off. It is used for all Test modes (CBC/DIFF/RETIC, CBC/DIFF, CBC ONLY, CBC/RETIC, and RETIC ONLY), but only in the Automatic aspiration mode.

Blood detector BD3 is the detector used for the VLS function. BD3 is located on the interface bracket installed on the BSV module. For location, refer to Figure 3.3-8.

VLS Diluent Error

During the vent-line backwashing process (controlled by SL1 in the Analytical Station), BD3 is used to detect the presence of diluent. If diluent is not detected, a *VLS Diluent* error is generated, and the Automatic mode is disabled because insufficient rinsing of the vent line can lead to carryover problems.

A *VLS Diluent* error indicates a problem in the vent-line backwashing process that requires further troubleshooting. See Troubleshooting and Servicing below.

VLS Air Error

During the vent-line drying process (controlled by SL33 in the Analytical Station), BD3 is used to detect the presence of air. If air is not detected, a *VLS Air* error is generated, and the Automatic mode is disabled because inadequate drying of the vent line can lead to dilution of the specimen in the tube.

A *VLS Air* error indicates a problem in the vent-line vacuum drying process that requires further troubleshooting. See Troubleshooting and Servicing below.

Calibration

BD3 is calibrated automatically whenever the GEN•S System or the LH 750 System is powered up or reset. You can also initiate a calibration of BD3 by using the F79 function on the Diluter/numeric keypad. The software routine for the automatic calibration and for calibration using F79 is the same, so you can use F79 as a troubleshooting function in the event of a VLS failure.

Diluent Prime and Calibration

Diluent is dispensed from the backwash tank via SL1 to prime the needle vent-line for 3 seconds. At the completion of the priming process, BD3 is automatically calibrated on the diluent. That is, the gain for BD3 is adjusted to a reference voltage of about 1 V.

Diluent and Air Checking

After the calibration routine, the vent line is primed with diluent for an additional 2.5 seconds during which BD3 is checked for diluent. The check is considered successful if the diluent value is between 70% and 100% of the calibration value or 0.7 to 1.0 V.

Immediately after the diluent check, SL33 is energized to vacuum dry the vent line for 9.5 seconds during which BD3 is checked for air. The check is considered successful if the air value is between 30% and 50% of the calibration value or 0.3 to 0.5 V.

Calibration and Diluent and Air Checking Retry

If the diluent or air checking routine fails, the System performs the calibration routine a second time. If the system fails to recover the correct diluent or air value a second time, a *VLS Diluent* or *VLS Air* error is generated and the Automatic mode for the System is disabled.

Troubleshooting and Servicing

ATTENTION: You must reset the GEN•S System or the LH 750 System to return it to the Automatic mode after a VLS error. However, F79 can be done continually.

Most VLS errors occur at installation and are usually caused by tubing kinks at the feed-thru or Y-fittings in the needle-vent/aspiration line. Under normal conditions, the diluent rinse flows very rapidly through the vent line, followed by a very rapid air dry.

After servicing the needle vent-line:

- Always do the F79 function to recalibrate BD3 prior to running cycles. This is necessary because any movement of the tubing within BD3 can affect the calibration value.
- If you moved or replaced the tubing in FD1, recalibrate all the SlideMaker fluid detectors. Refer to Heading 4.9, FLUID DETECTOR CALIBRATION.

ABBREVIATIONS, ABBREVIATIONS-1

CONTENTS

The following list is a composite of the abbreviations, acronyms and reference designators used in this manual. When the same abbreviation (or reference designator) is used for more than one word (or type of component), all meanings relevant to this manual are included, separated by a semicolon.

SYMBOLS

° - degrees

= - equals

> - greater than

≥ - greater than or equal to

< - less than

µA - micro-amperes

µL - microliter

- - minus

- number

% - percent

+ - plus

± - plus or minus

® - registered

NUMBERS

1st - first

2nd - second

A

A - ampere

ABS - acrylonitrile butadiene styrene resin

ac - alternating current

acc - accumulator

accum - accumulator

ACK - acknowledge

adj - adjustment

adv - advance

AGND - analog ground

assy - assembly

aux - auxiliary

B

BD - blood detector

BSV - blood sampling valve

buf - buffer

C

C - Celsius

cass - cassette

CD-ROM - compact disc read only memory

cfm - cubic feet per minute

cham - chamber

CL - cylinder

cleard - cleared

clk - clock

cm - centimeter

cntl - control

cntlr - controller

comm - communication

CP - custom part

CPU - central processing unit

CR - current regulator (semi-conductor device)

CRC - cyclic redundancy check

cts - clear to send

CV - check valve

CW - clockwise

D

D/A - digital to analog converter

dc - direct current

DCN - document control number

det - detector

DGND - digital ground

dly - delay

DP - diametrical pitch; dispense pump

dpst - double pole, single throw

DUART - dual universal asynchronous receiver transmitter

DWN - down

E

ea - each
ed. - edition
elev - elevator
EMC - electromagnetic capability
EMI - electromagnetic shield
en - enable
enc - encoder
ESD - electrostatic discharge
ETL - Electrical Testing Laboratories
EVR - electronic vacuum regulator
ext - external
extd - extended

F

F - Fahrenheit
FCC - Federal Communication Commission
FD - fluid detector
FF - feed-thru fitting
filt - filter
FR - reducer fitting
FRC - field replaceable component
FRU - field replaceable unit
ft - feet
FT - T-fitting
FU - union fitting
FY - Y-fitting

G

GND - ground

H

Hg - mercury
Hi - high
HNGND - high noise ground
hsc-hd (screw) - hex-socket head
Hz - Hertz

I

IBUS - instrument bus
IC - integrated circuit
i.d. - internal diameter
ID - identification
IEC - International Electrical Commission
in. - inches
inhib - inhibit
INST - instruction
int - interior
I/O - input/output
isol - isolation; isolator

J

J - receptacle connector

K

K - thousand

L

L - left; long
lb - pound
LCD - liquid crystal display
LED - light emitting diode
LST - language support tool

M

m - meter
M - motor
mA - milli-amperes
max - maximum
mech - mechanism
MF - manifold
MHz - mega Hertz
mm - millimeter
mon - monitor
MUX - multiplexer
mV - millivolts

N

N/A - not applicable
NAK - not acknowledged
NC (nc) - normally closed
NO - normally open

O

o.d. - outer diameter
oz - ounces

P

P - plug connector
PC - personal computer (GEN•S Workstation)
PCB - printed circuit board (card)
PL - plunger (a type of cylinder)
PN - part number
pneu - pneumatics
pos - position
pres - pressure
prn - printer
PS - power supply
PS MON (card) - Power Supply Monitor
psi - pounds per square inch
PVC - polyvinyl chloride
PWR - power

Q

QD - quick disconnect

R

R - resistor; right
RAM - random access memory
RAS - remote access services
RB - rinse block
ref - reference
REG - regulator
rel - release
RES - reservoir
RET - return
Retic - reticulocytes
retr - retracted
rev - revision
RFI - radio-frequency interference
ROM - read only memory
rst - reset
RVac - regulated vacuum
RXD - received

S

S - switch
S/A - subassembly
SEN - sensor
SOL - solenoid
SVP - system verification procedure
SW - switch
sys - system

T

temp - temperature
thd - thread
thk - thick
TK - tank
TM - trademark
TOF - top-of-form
TP - test point
TXD - transmitted

U

U - integrated circuit package
UL - Underwriters Laboratory

V

V - volts
Vac - volts alternating current
vac - vacuum
VC - vacuum chamber
VCC - logic voltage
Vdc - volts direct current

VL - valve
VPP - programming voltage

W

W - watt; wide
w/ - with

X

xfer - transfer
xover - crossover

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